# INSTRU

- RECESS MOUNTING:
  1- Heater must be used with recess box.
  2- Never install warm air outlet of heater less than 10 in. (250 mm) from floor or adjacent wall.

  - Provide a wall opening as: Depth : 45/16 in. (109 mm) Height : 19 7/8 in. (506 mm) Length : Single unit : 14 7.
- Length: Single unit: 147/16 in. (368 mm)
   Double unit: 30.3/16... (767 mm)
   Triple unit: 46.5/8 in. (1185 mm)
  Remove the appropriate knock-out from the recess box for the

4-

- electrical supply.

  Attach firmly the recess box using provided screws.

  Make sure that the edge on each side of the recess box lean on the gypsum panel and not on the structural parts of the wall.

  See marking on the sides of the recess box.
- Install the heater to the recess box and be sure that the heater is attach firmly with four (4) provided screws.

  Connect the heater leads to the supply leads according to national and local codes. See writing diagram in the front cover of the heater. Make sure the fan rotates freely and that there is no foreign
  - - object in the heater. &
- 9- Install the front cover using the provided screws. IMPORTANT: To insure that the front cover is not upside down, check if the logo is in the correct orientation.
  10- To test the heater temporarily, set thermostat at maximum temperature.

# SURFACE MOUNTING: Model 4 in. (102 mm)

- 1- The surface box must be used with recess box.2- Never install warm air outlet of heater less than
- Never install warm air outlet of heater less than 10 in. (250 mm) from floor or adjacent wall
- Locate the power supply leads behind the planned location of the heater (surface box).
   Mount the surface box securely to the wall with provided screws. IMPORTANT: For a single surface box, there are two brackets fixed at the top and bottom. Unfold the metal hooks to remove the brackets. Insert brackets in the surface box before continuing the installation. See illustration to install properly. Follow instructions 4 to 10 as above for recess mounting.
  - SEMI-RECESSED MOUNTING:

# Model 1 in. (25 mm) and Model 2 in. (51 mm)

- 1- The surface box must be used with recess box.2- Never install warm air outlet of heater less than 10 in. (250 mm) from floor or adjacent wall. Provide a wall opening as:
  - Depth for 1 in. model: 3 5/16 in. (84 mm) Depth for 2 in. model: 2 5/16 in. (59 mm) Height: 19 7/8 in. (506 mm)
- Length : Single unit : 114 7/16 in (368 mm)

   Double unit : 30 3/16 in. (767 mm)

   Triple unit : 46 5/8 in. (1185 mm)

  4- Locate the power supply leads behind the planned location of the
- remove the brackets. Insert brackets in the surface box before continuing the installation. See illustration to install properly. Follow instructions 4 to 10 as above for recess mounting. heater (surface box).

  Mount the surface box).

  Mount the surface box securely to the wall with provided screws.

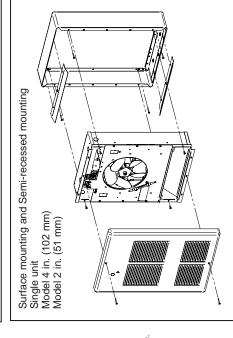
  MOUNTANT: For a single surface box, model 2 in. (51 mm) there are two bracktets fixed at the top and bottom. Unfold the metal hooks to

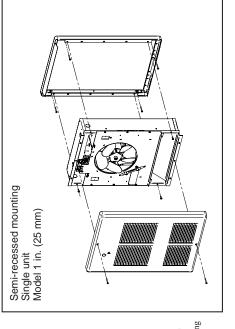
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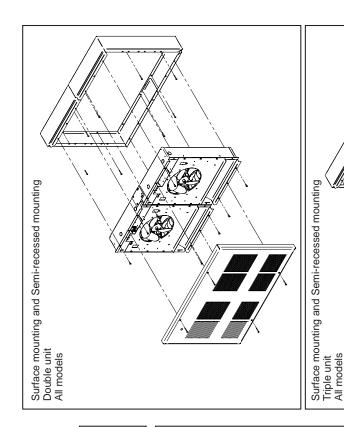
CAUTION:
High temperature, risk of fire, keep electrical cords, drapery, furnishings, and other combustibles at least 36 in. (915 mm) from the front of the heater. To reduce the risk of fire, do not store or use gasoline or other flammable vapors and liquids in the vicinity of he heater.

# IMPORTANT

- Do not obstruct front of heater for at least 48 in. (1220 mm). Any remote thermostat or relay must be connected to the heater control terminal
- Do not interrupt power supply to control this heater.

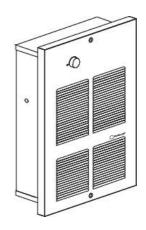


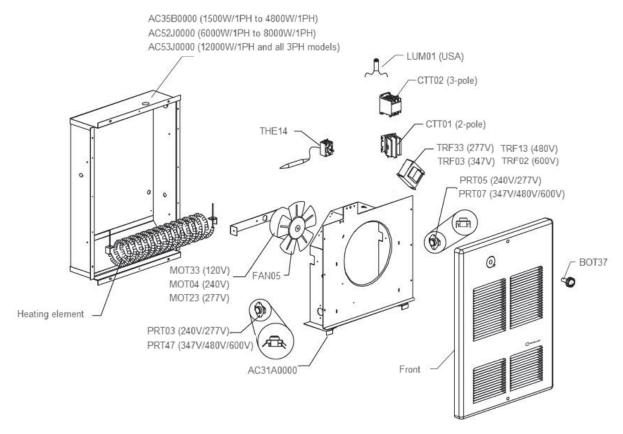






Commercial Wall Heater





Amp	Fusible	Porte fusible Fuse holder		
	Fuse	Avant le 14 août 2013 Before August 14, 2013	After le 14 août 2013 After August 14, 2013	
15	FUS02	FUS03	FUS07	
30	FUS09	FUS07	FUS07	



#### Page 2 of 2

Watts (PH)	Devant Front
1500 (1) - 4000 (1)	AC07A000*
4800 (1)	AC29A000*
6000 (1) - 8000 (1)	AC11A000*
12000 (1) **	AC14A000*

 $<sup>^{\</sup>star}$  Couleurs sur mesure disponible sur demande. / Custom colors available upon request.

<sup>\*\* 12000</sup>W/1PH et tous les modèles 3PH. / 12000W/1PH and all 3PH models.

Watts (PH)	Élément chauffant  Heating element						
	120V	208V	240V	277V	347V	480V	600V
1500 (1)	ELO114	-	ELO71	ELU32	ELO66	ELU71	ELO67
2000 (1)	-	ELO72	ELO47	ELU20	ELO50	ELU24	ELO53
3000 (1)	-	-	ELO48	ELU21	ELO51	ELU25	ELO54
4000 (1)	-	ELO46	ELO49	ELU22	ELO52	ELU26	ELO55
4800 (1)	-	ELU30	ELU31	ELU33	ELO107	ELU58	ELO106
6000 (1)	-	-	ELO48	ELU21	ELO51	ELU25	ELO54
6000 (3)	-	ELO72	-	-	-	-	ELO53
8000 (1)	-	ELO46	ELO49	ELU22	ELO52	ELU26	ELO55
9000 (3)	-	ELO49	-	-	-	-	ELO54
12000 (1)	-	ELO46	ELO49	ELU22	ELO52	ELU26	ELO55
12000 (3)	-	ELO46	-	-	-	ELU26	ELO55

#### test

watts	volts	
	ELU26	





INC.

Tel.: (905) 829-4422 Fax: (905) 829-4430 Tel.: (705) 325-3473 Fax: (705) 325-2106 Tel.: (514) 334-3720 Fax: (514) 334-6491 Tel.: (716) 564-0010 Fax: (716) 564-0044

# INSTALLATION AND MAINTENANCE INSTRUCTIONS IMMERSION HEATERS - TYPES CX & DX



#### 1.0 INSTALLATION

- 1.1 Immersion heaters are designed for operation only while completely immersed in liquids. Never allow the heating elements to be exposed while energized or failure will result.
- 1.2 CAUTION: Use the heater only in liquids and at pressures for which it was designed. Normally copper sheath is recommended in water, steel or alloy sheath in oil, and the appropriate alloy sheath for heating chemical solutions. Check factory for recommendations.
- 1.3 In the case of flanged (and some screwplug type) heaters where a gasket seal is required, the gasket surface should be clean and dry before the heater is seated.
- 1.4 The terminals must be protected at all times from moisture or vapour. In hazardous locations, explosion resistant terminal housings must be used. In outdoor locations, moisture resistant housings are required.
- 1.5 Protect terminals of heating elements from drippings, condensation, fumes, spray or any other substance which could result in element contamination.
- **1.6** When melting solids by direct immersion, a surface vent should be provided to allow gases to escape. Operate the heater on ½ voltage until melted material completely covers the heating elements. Heaters used for this purpose may require special design features. Check factory for recommendations.

#### 2.0 WIRING AND CONTROL

- 2.1 Heaters must be wired by qualified personnel to electrical code requirements.
- 2.2 Check supply voltage for compliance with heater nameplate voltage.
- 2.3 A line voltage or pilot duty thermostat should be used to control the heater. The pilot duty thermostat must be used with a contactor and (if required) a transformer. Generally, heaters supplied with built-in thermostats will be factory prewired if suitable for line voltage operation. Integral thermostats not factory prewired are usually intended for pilot duty.
- 2.4 It is recommended that the control circuits be supplied from the isolated secondary windings of transformers obviating the need for two supply circuits, or as an alternative, that mechanical or electrical interlocking be provided so that both supplies must be disconnected before live parts can be made accessible.
- 2.5 If there is even the slightest possibility that the liquid level may fall below the elements, a level control switch or over-temperature sensing device affixed to the uppermost heating element is required. Check factory for recommendations.
- 2.6 Heaters with explosion resistant terminal housings must only be used in locations for which the heaters are certified.
  - a) Check heater nameplate information for approval code.
  - b) Never energize an explosion resistant heater unless the terminal housing cover is properly tightened.
  - c) An immersion heater for hazardous locations is approved for use only if an approved liquid level control is used to de-energize the heater under low liquid conditions.

#### 3.0 START-UP INSPECTION

- 3.1 Check that all terminal connections are tight.
- 3.2 Heaters stored for prolonged periods may absorb moisture. Using a megger (insulation resistance tester) check the value of the insulation resistance to ground for each circuit. Initial readings of over 500,000 ohms to ground are normally acceptable. Should lower readings be observed, check factory for instructions.

#### 4.0 MAINTENANCE

- 4.1 DISCONNECT POWER BEFORE SERVICING.
- 4.2 Remove the immersion heater periodically to inspect for corrosion, sludge built-up and for scale removal.
- 4.3 Periodically check electrical connections for tightness.

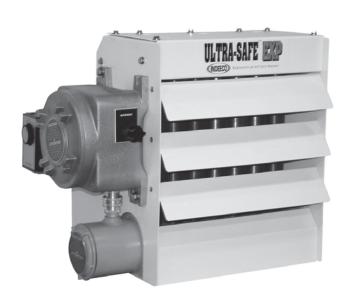
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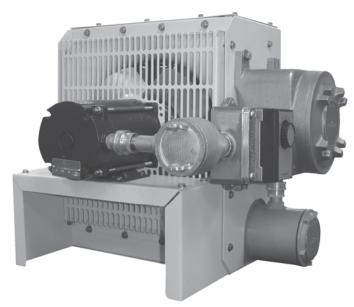
## **INDEECO**

### Owner's Manual

#### **ULTRA-SAFE EXP Series**

**Electric Forced Air Heater for Hazardous Locations** 





#### This manual covers installation, maintenance and repair parts.

FM and CSA Approved for the following classified areas:

Class I, Divisions 1 & 2, Groups C & D

Class II, Divisions 1 & 2, Groups F & G

Operating Temperature Code T3C - 320°F (160°C)

Class I, Zones 1 & 2, Group IIB, T3 (FMUS & CSAUS only)

or

Class I, Divisions 1 & 2, Groups C & D

Class II, Divisions 1 & 2, Groups E, F & G

Operating Temperature Code T3C - 320°F (160°C)

Class I, Zones 1 & 2, Group IIB T3 (FMUS & CSAUS only)

See Data Plate for Specific Area Classification

For details on the particular hazardous environments having the potential for explosion, refer to Articles 500 through 516 of the National Electric Code, and/or Section 18 of the Canadian Electric Code, Part I.





#### WARNINGS

Installation and maintenance personnel should familiarize themselves with this manual and all the **WARNINGS** before installing or working on this heater to avoid potential hazardous conditions, severe property damage, personal injury or death.

- 1. To reduce the risk of ignition of hazardous atmospheres: Do not install where the operating temperature code limit exceeds the ignition temperature of the hazardous atmosphere.
- 2. Potentially lethal voltages are present. Be sure to lock the branch circuit disconnect switch in the OFF position and tag the circuit "Out for Maintenance" before working on this equipment.
- Keep electrical enclosure covers tightly closed while in operation.
- 4. Hazard of Electric Shock. Heater must be grounded in accordance with the N.E.C. and/or C.E.C.
- 5. This heater should be installed by qualified personnel familiar with the National Electric Code and/or the Canadian Electrical Code requirements for hazardous locations. It is the responsibility of the installer to verify the safety and suitability of the installation.
- Disassembly of the unit, for installation, is not required or authorized.
- 7. When connecting the room thermostat, be sure that the thermal cutouts remain connected in series with the controlling contactor. The unit must not operate without the thermal cutouts properly connected in the circuit.
- 8. Do not attempt to install a "Fan Only" switch on a standard unit heater and do not try to field modify a standard unit heater for this option. The heater must have been ordered for this option to have the necessary internal controls.
- Replacement of electrical components should only be done by qualified personnel familiar with the requirements of maintaining electrical equipment in hazardous locations.
- 10. Replacement electrical components must be obtained from the factory in order to maintain the hazardous location rating.

- 11. The heat exchanger is a factory vacuum-sealed unit. Do not attempt to loosen or tighten any of the fill or drain plugs or attempt to operate the pressure relief valve. A loss of vacuum could cause nuisance tripping of the cutouts or high pressures which will cause the relief valve to actuate with an accompanying loss of liquid. Should leakage occur, remove unit from service and investigate cause.
- 12. The heat exchanger is filled with a mixture of water and inhibited propylene glycol. Contact with the fluid at operating temperatures may produce a burn hazard. The Material Safety Data sheets indicate that there is not a health hazard from coming in contact with the inhibited propylene glycol. Suggested first aid consists of flushing eyes with plenty of water and to wash off skin in flowing water or a shower.
- 13. Install and operate in an upright position only. Failure to comply will cause the overtemperature thermal cutouts to trip.
- 14. Installation minimum mounting clearances on nameplate must be maintained.
- 15. Use copper wire for supply connections according to size and rating on nameplate.
- 16. Do not attempt to override louver stops or operate unit with louvers fully closed.
- 17. "Warning Light", if supplied, will turn on if the high temperature thermal cutout opens. This could result if the heat exchanger is dirty, inlet air is obstructed, vacuum loss in heat exchanger, fan not turning or incorrect supply voltage. Disconnect power to unit before servicing.
- 18. Crackling noises within the heat exchanger at startup are normal.

WARRANTY WILL BE VOID IF INSTRUCTIONS ARE NOT FOLLOWED.

#### **GENERAL**

The air heaters are designed for comfort heating and should not be used in ambient temperatures exceeding 104°F (40°C). The units may be wall, pole or ceiling mounted. They utilize a hermetically sealed, liquid-to-air heat exchanger containing immersion type electric heating elements. A mixture of nontoxic propylene glycol and water is place in the heater core to act as a heat transfer fluid. The propylene glycol provides freeze damage protection to -49°F (-45°C). The unit is designed to give years of safe, trouble-free operation when properly installed and maintained.

#### **INSTALLATION**

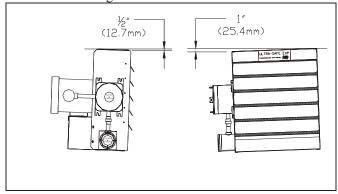
#### A. Site Selection:

The Heaters should not be mounted close to drapery or similar materials which could lay on the cabinet, or block the inlet or outlet of the heater. The heaters are intended for elevated mounting locations so that they blow warm air down to the floor area. A mounting height should be selected so that the heater is out of the way of possible moving equipment or personnel, yet low enough to deliver warm air to the selected area. See mechanical installation instructions for recommended installation heights.

#### **B.** Mechanical Installation:

Once an acceptable location has been determined, follow these instructions to complete the mechanical installation.

1. The Heaters are designed for use only while permanently mounted in an upright, level position. See figure below maximum tilt angles:



2. To ensure proper heating of floor surfaces, observe the following recommended maximum mounting heights (to bottom of heater):

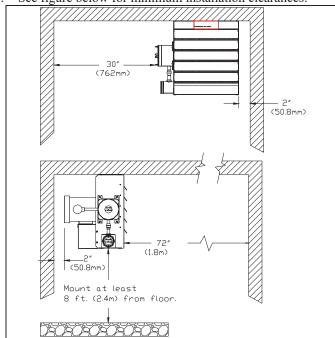
#### Maximum Mounting Height from Floor:

233-FA	233-FB	233-FC
9 ft.	10 ft.	13 ft.
(2.7m)	(3.0m)	(4.0m)
(2.7111)	(5.0111)	(4.0

3. The supporting structure that the heater is attached to must have adequate strength to safely support the heater and be sufficient to keep the heater in its proper upright operating position. The maximum unit weights are:

MODEL	lbs	(kgs)
233-FA	150	68
233-FB	200	91
233-FC	250	114

4. See figure below for minimum installation clearances:



- 5. The heater may be suspended from overhead beams or mounted to a side wall or a 4" pipe using one of the approved mounting kits. Use of non-approved mounting kits voids all warranties, expressed or implied.
- 6. Wall mounting should be to structural steel. If the wall construction is plasterboard with wooden 2 X 4 framing or similar, it must be reinforced with angle iron or wooden cross braces.
- 7. Lock washers should be used on all mounting nuts and bolts to ensure they don't vibrate or work loose due to fan vibration or other vibration transmitted to the heater.

#### C. Electrical Installation:

Follow these instructions to complete the electrical installation:

- 1. External branch circuit protection is required. See nameplate ratings and follow Code recommendations.
- 2. Use only an approved explosion-proof means of wiring, such as mineral insulated cable or copper conductors in rigid conduit with conduit seals as required to make connection to the heater.
- 3. Follow the NEC and/or CEC and any local electrical and building codes related to the installation and intended use of the heater in an explosion-hazard area.
- 4. When doing any work on a heater, including the initial electrical connection, disconnect the electrical current at the main branch circuit switch, and lock the switch in the off (open) position and tag the circuit "Out for Maintenance" to prevent potential lethal shock hazards.
- 5. Confirm that the electrical power supply matches the nameplate voltage, phase, amperage and frequency rating of the heater to be connected.
- 6. Ensure conductors are of appropriate gauge size. The minimum gauge is stamped on the nameplate. Size all input conductors according to accepted standards consistent with the temperature rating of the wire being used. Use minimum 75°C rated wire.

- 7. Proper installation of the heater requires that an adequate grounding conductor be connected to the ground terminal. This terminal is painted green or marked with the letter "G" and is located on the inside of the control enclosure next to the power input opening.
- 8. Check and confirm all connections are securely fastened.
- 9. Before application of electrical power, check all connections to ensure compliance with the wiring diagram and any code requirements. Remove any foreign objects from the control boxes. Reinstall covers tightly.
- 10. On all 3-phase heaters, it is necessary to verify that the fan is rotating in the proper direction. If air delivery is not from the front of the heater, exchange any 2 input wires at the main contactor terminal located in the control enclosure.
- 11. The explosion-proof control box is designed with threaded joints and metal-to-metal contact at the lid or cover joint to prevent an explosion. Do not attempt to install gasket material of any type at these joints. A light coating of anti-seize compound is applied to the threads to prevent seizing.
- 12. See section titled "operation" before energizing the heater.

#### D. Field Installed Controls:

#### 1. Power Disconnect Switch:

The NEC requires that a power disconnect switch be mounted within sight of the heater. The CEC or local codes may require a disconnect switch within sight of the heater. Refer to the electrical diagram and follow these steps:

- a.) The remote power disconnect switch must be an explosion-proof disconnect switch rated for the area classification.
- b.) The switch must be indicating and have a locked off position.
- c.) The switch must be rated for the nameplate voltage and current per the NEC, CEC and any local codes.
- d.) Follow steps 6 through 12 of the electrical installation instructions to complete the installation.

#### 2. Room Thermostat:

Refer to the electrical wiring diagram and follow these steps:

- a.) Connect the remote thermostat across the leads marked "C" and "C1". The external thermostat will then be in series with the heater thermal high-limit switches and correct operation of the heater will result.
- b.) The wiring to the remote thermostat must be copper wire, 16 gauge minimum (for Class II) or 14 gauge minimum (Class I) and run in explosion-proof conduit with appropriate conduit seals installed per the NEC, CEC and any local codes.
- c.) Any room thermostat used with this heater must be of an explosion-proof type rated for the area classification, open on temperature rise, rated 250VAC, 75VA inductive capacity.

#### 3. 'Fan Only' Switch:

Refer to the electrical wiring diagram and follow these steps:

- a.) Do not attempt to install a "Fan Only" switch on a standard unit heater and do not try to field modify a standard unit heater for this option. The heater must have been ordered for this option to have the necessary internal controls.
- b.) Connect the remote 'fan only' selector switch across the leads marked "C" and "F".
- c.) The wiring to the fan selector switch must be copper wire, 16 gauge minimum (for Class II) or 14 gauge minimum (for Class I) and run in explosion-proof conduit with appropriate conduit seals installed per the NEC, CEC and any local codes.
- d.) Any selector switch used with this heater must be an explosion-proof switch rated for the area classification, maintained 2 position selector switch rated for 250 VAC, 75 VA inductive.

#### **OPERATION**

The unit heater may be operated normally at ambient temperatures of 104°F (40°C) or less and at altitudes of 3,300 feet (1000m) or less in atmospheres containing less than 21% oxygen by volume, and as classified on the nameplate. All of these conditions must be met before attempting to operate the heater. The heater should never be operated in an oxygenenriched atmosphere or at ambient temperatures above 104°F, (40°C). The heater may be operated at higher altitudes if the ambient temperatures are below 104°F, (40°C).

#### A. Initial Operation:

Check to make sure the mechanical and electrical installation is complete and that it is safe to operate the heater.

- 1.) Heater without built on or remotely mounted fan switch:
  - a.) Set the temperature control thermostat to a setting above the current room temperature.
  - b.) Energize the heater electrical supply circuit.
  - c.) The heater and fan should come on and in 5 to 15 minutes reach a stable operating temperature. If the room temperature is high and the installation is above 3,300 feet, the unit heater may cycle on the thermal high limits of the motor or the heater.
  - d.) Check out and report any unusual or questionable operating characteristics, such as noise, vibration, loss of fluid, etc. Note that crackling noises coming from the heat exchanger during warm up are normal.
  - e.) Set the temperature control thermostat to the desired room temperature setting.
  - f.) De-energize the heater electrical supply circuit until heater operation is required.
- 2.) Heater with fan switch:
  - a.) Place the fan switch in the fan position.
  - b.) Set the temperature control thermostat to a setting below the current room temperature.
  - c.) Energize the heater electrical supply circuit.
  - d.) The heater fan should come on but the heater should remain off.
  - e.) Place the fan switch in the auto position.
  - f.) The fan should go off.
  - g.) Set the temperature control thermostat to a setting above the current room temperature.

- h.) The fan and heater should operate. If the room temperature is high and the installation is above 3,300 feet (1000m), the unit heater may cycle on the thermal high limit cutouts of the motor or the heater.
- i.) Check out and report any unusual or questionable operating characteristics, such as noise, vibration, loss of fluid, etc.
   Note that crackling noises coming from the heat exchanger during warm up are normal.
- j.) Set the fan switch and temperature control thermostat to the desired operating positions.

#### B. Normal Operation:

Prior to the start of the heating season, perform the electrical and mechanical steps outlined in the section titled "maintenance".

- a.) Perform the Operation steps for the applicable temperature control option.
- b.) Place all switches in their normal operating position and place the unit heater in service.

#### **MAINTENANCE**

Maintenance and repair must be performed by qualified personnel only.

#### A. Electrical:

- Inspect all terminal connections, contactor and conductor insulation for damage, looseness, fraying, etc., as applicable. Tighten any loose terminals and replace or repair wire with damaged or deteriorated insulation. If contactor contacts are badly pitted, welded together, or burned, replace the contactor. Check all explosion-proof conduit for visible damage and tightness.
- 2. If reduced heat output is suspected, perform the mechanical checks. If low heat output is still suspected after completing the mechanical checks, verify the condition of the heating elements by using an amperage meter to check the current draw of each input line. All input lines should draw approximately equal current which should agree with nameplate rating. If they do not, one or more of the heating elements could be burned out and the heater/core assembly should be replaced.
- 3. The electric motor is permanently lubricated and thermally protected. Check for smooth and quiet running at all inspections. Replace motor if excessive bearing play is detected. Contact the factory for instructions.

#### B. Mechanical:

- 1. Never attempt to fill, drain or check the liquid level of the heat exchanger or check the action of the pressure relief valve. Contact the factory for instructions.
- 2. The explosion-proof control box is designed with threaded joints and metal-to-metal contact at the lid or cover joints to prevent an explosion. Do not attempt to install gasket material of any type at these joints. A light coating of anti-seize compound is applied to the threads to prevent seizing.

- 3. Annually check the tightness of all visible bolts and nuts, in particular the support structure bolts and nuts. Similarly check the motor mounting bolts and nuts.
- 4. Periodically, check the motor, fan and heater core fins for cleanliness. A dirty heat exchanger can cause the unit to over heat and cycle on the thermal cutouts. If the dirt is loose dust, clean with a vacuum or by air jet. If the dirt can't be vacuumed or blown off, use a warm water spray directed to the inlet side of the heat exchanger then to the outlet side. A soft bristled brush may be required to loosen stubborn deposits. Be careful not to bend the aluminum fins on the heat exchanger or the fan blade propeller. Allow unit to dry before re-energizing.
- 5. Check louvers for position tightness and equal angle settings. Check motor and fan for smooth running operation. Any unusual noise or vibration must be investigated and rectified.
- 6. Should there be any evidence of fluid leakage from the heater core, the heater should be repaired immediately. The heater will not operate properly with a low fluid level. Contact the factory for replacement core.

#### REPAIR AND REPLACEMENT

Maintenance and repair must be performed by qualified personnel only.

#### A. Replacing the Heat Exchanger Core:

The heat exchanger core is not field repairable. Contact factory for replacement.

- 1. Disconnect the heater electrical power supply, unwire and lower the heater from it's mounting location. Set heater face down on a table or on the floor.
- 2. Remove the cabinet bottom, cabinet top, wiring and heater enclosure covers.
- 3. Disconnect all heater wires from the contactor in the wiring enclosure. Disconnect the control wiring from thermal cutout.
- 4. Thread conduit into wiring enclosure to disconnect the heater terminal box.
- 5. With an assistant supporting the weight of the heat exchanger, remove the 3 heat exchanger mounting bolts. Carefully remove the heat exchanger out of the bottom of the cabinet.
- 6. Locate rating tag on the heat exchanger and verify that electrical ratings of the core to be installed match the electrical ratings on the heater nameplate.
- 7. To reinstall, slide the core through the bottom of the cabinet while an assistant lines up and installs the 3 heat exchanger mounting bolts.
- 8. Guide the heater lead wires back into the wiring enclosure.
- 9. Reconnect the heater lead wires to the contactor and the conduit.
- 10. Reattach the cabinet bottom and enclosure covers before mounting heater and energizing.

#### **B.** Replacing the Temperature High-Limit Cutouts:

 Disconnect the heater electrical power supply and remove the heater enclosure cover.

- 2. Remove the wire barrier to expose the high limit cutout.
- 3. Disconnect the wires from the high limit cutout and mark their location.
- 4. Remove the two nuts used to attach the temperature high limit cutout.
- 5. Lift and remove the sheetmetal mounting plate.
- 6. Carefully lift and remove the temperature high limit cutout.
- 7. Use only factory supply parts for safe operation.
- Lightly coat the new manual and automatic cutout bulbs with the supplied thermal transfer compound. This is critical for proper cutout operation.
- 9. Carefully slide the automatic cutout bulb into the <u>left</u> thermowell and the manual cutout bulb into the **right** thermowell.
- 10. Reinstall the sheetmetal plate. Note that the sheetmetal plate also acts as a stop to keep the cutout bulbs from backing out of the wells.
- 11. Carefully install the temperature high limit control to avoid putting kinks into the capillary.
- 12. Reattach the wires to the cutout and reinstall the wire barrier.
- 13. Ensure heater enclosure cover is in place before energizing heater.

#### C. Resetting the Manual Cutout:

All unit heaters contain a built-in manual reset thermal cutout with or without backup contactor.

- 1. Disconnect the heater electrical power supply and remove the heater enclosure cover.
- 2. Determine the reason for the manual reset thermal cutout actuating and rectify the situation. See section titled "maintenance".
- Reset the manual reset thermal cutout by pressing on the red stem in the center of the control
- 4. Replace the heater enclosure cover securely.
- 5. Energize the heater electrical supply circuit.
- 6. The heater and fan should come on and in 5 to 15 minutes reach a stable operating temperature.
- 7. Check out and report any unusual or questionable operating characteristics, such as noise, vibration, loss of fluid, etc.
- 8. If heater operation appears normal, place the unit into normal operation.

#### D. Replacing the Fan Motor and Blade:

The fan motor is permanently lubricated and does not require any maintenance. If the fan motor is defective, a replacement must be obtained from the factory.

- 1. To replace the fan motor:
  - a. Disconnect the heater electrical power supply.
  - b. Disconnect the motor supply wires from the contactor in the wiring enclosure.

- c. Disassemble the conduit union located at the motor wiring hub.
- d. Remove top fan guard and motor mounting bolts.
- e. Lift motor out of heater assembly.
- f. Remove fan blade and conduit union from defective motor and install on new motor.
- g. Install new motor to heater using existing motor mounting hardware.
- h. Reinstall top fan guard and ensure that the fan blade rotates freely.
- i. Feed motor wires through conduit and into wiring enclosure.
- Reattach conduit union. Reconnect motor wires to contactor.
- k. Check fan rotation by momentarily energizing heater. Airflow should exit from front of heater cabinet. If rotation is incorrect, disconnect electrical power supply and reverse two of the motor lead wires at the contactor.
- 1. Reattach wiring enclosure cover before placing heater back in service.

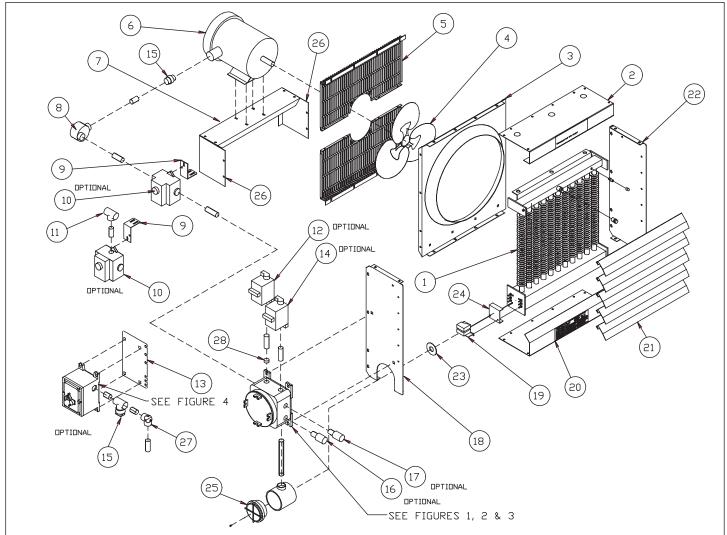
#### 2. To replace the motor fan blade:

- a. Remove the top fan guard.
- b. Remove the four motor mounting bolts and disconnect the conduit union at the motor.
- c. Loosen the bolt that connects the fan blade to the motor shaft.
- d. Slide the motor back and tilt in order to remove the old blade & install a new one.
- e. Tighten the fan blade attachment bolt to the motor shaft.
- f. Reattach the motor conduit union and the four motor mounting bolts.
- g. Reinstall the top fan guard and ensure that the fan blade rotates freely.

#### **REPLACEMENT PARTS**

- 1. All replacements must be factory supplied to ensure safe heater operation.
- 2. Mark wires and refer to wiring diagram to ensure proper electrical connections.

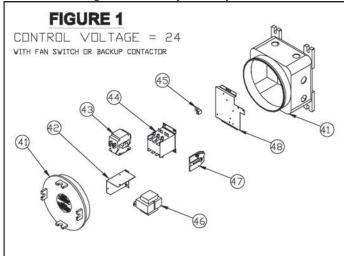
Reference heater catalog number and item number in figures below when contacting factory for replacement parts. Contact factory for items not shown.

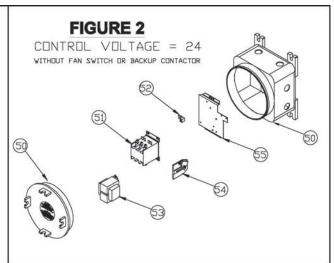


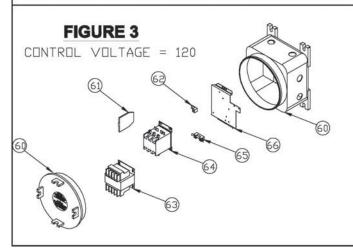
ITEM	DESCRIPTION
1	Heat Exchanger Core Assy.
2	Cabinet – Top
3	Fan Venturi
4	Fan Blade
5	Fan Guard
6	Fan Motor
7	Motor Support – Top
8	Motor Junction Box
9	Thermostat Support Bracket
10	Thermostat
11	Conduit Tee
12	Disconnect Switch – Small
13	Large Disconnect Support Bkt.
14	Fan Switch

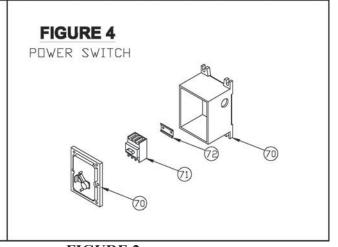
ITEM	DESCRIPTION
15	Conduit Seal
16	Pilot Light – Bottom
17	Pilot Light – Top
18	Cabinet – Left Side
19	High Limit Cutout
20	Cabinet – Bottom
21	Cabinet - Louver
22	Cabinet – Right Side
23	High Limit Barrier
24	High Limit Mounting Bridge
25	Heater Enclosure Cover
26	Motor Support – Side
27	<sup>3</sup> / <sub>4</sub> " Conduit Pull Elbow
28	Reducer Bushing

Select the Figure that corresponds to your heater.









#### FIGURE 1:

ITEM	DESCRIPTION
41	Wiring Enclosure and Cover
42	Option Mounting Bridge
43	Option Contactor
44	Main Contactor
45	Ground Lug
46	Transformer
47	Auxiliary Contact
48	Main Mounting Bridge

#### FIGURE 2:

ITEM	DESCRIPTION
50	Wiring Enclosure and Cover
51	Main Contactor
52	Ground Lug
53	Transformer
54	Auxiliary Contact
55	Main Mounting Bridge

#### FIGURE 3:

ITEM	DESCRIPTION
60	Wiring Enclosure and Cover
61	Auxiliary Contact
62	Ground Lug
63	Transformer
64	Main Contactor
65	Transformer Fuse & Fuse Block
66	Main Mounting Bridge

#### FIGURE 4:

ITEM	DESCRIPTION
70	Switch Enclosure and Cover
71	Disconnect Switch
72	Disconnect Switch Track

# Magelis GTO HMI User Manual

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The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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	Memory, Clock, and Touch Panel
	momory, clock, and rought and contract and c

	Interface Specifications
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#### **Safety Information**



#### **Important Information**

#### **NOTICE**

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death

#### DANGER

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.

#### **WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### **A** CAUTION

**CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

#### NOTICE

NOTICE is used to address practices not related to physical injury.

#### **PLEASE NOTE**

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

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#### **About the Book**



#### At a Glance

#### **Document Scope**

This manual describes how to use the HMIGTO panels.

#### **Validity Note**

This documentation is valid for Vijeo Designer 6.2 or higher.

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page www.schneider-electric.com.
2	In the <b>Search</b> box type the reference of a product or the name of a product range.  • Do not include blank spaces in the model number/product range.  • To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the <b>Product Datasheets</b> search results and click on the reference that interests you.  If you entered the name of a product range, go to the <b>Product Ranges</b> search results and click on the product range that interests you.
4	If more than one reference appears in the <b>Products</b> search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click <b>Download XXX product datasheet</b> .

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

#### **Product Related Information**

#### **A** WARNING

#### UNINTENDED EQUIPMENT OPERATION

The application of this product requires expertise in the design and programming of control systems. Only persons with such expertise should be allowed to program, install, alter, and apply this product.

Follow all local and national safety standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

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# **Chapter 1**Overview

#### Overview

This chapter describes the panels and general topics such as package contents and standards.

#### What Is in This Chapter?

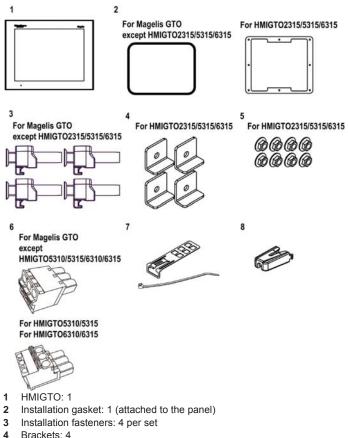
This chapter contains the following topics:

Торіс	Page
HMIGTO Package Contents	10
Certifications and Standards	11
GTO Series of Panels	13

#### **HMIGTO Package Contents**

#### Overview

Verify all items listed here are present in your package:

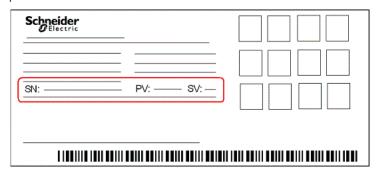


- Brackets: 4
- M4 Hex Nuts: 8
- 6 DC power connector: 1\*1
- USB cable clamp Type A: 1 set (1 clip and 1 tie)
- 8 USB cable clamp mini-B: 1 (1 USB holder)
- HMIGTO Quick Reference Guide: 1

This product has been carefully packed with special attention to quality. However, should you find anything damaged or missing, please contact your local distributor.

#### Revision

You can identify the product version (PV), revision level (RL) and the software version (SV) from the unit product label.



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<sup>\*1</sup> You can use the DC power connector for HMIGTO1300/1310/2300/2310/2315/3510/4310 to supply power to HMIGTO5310/5315/6310/6315. However the reverse is not possible. You cannot use the power connector for HMIGTO5310/5315/6310/6315 on HMIGTO1300/1310/2300/2310/2315/3510/4310.

#### Certifications and Standards

#### Introduction

Schneider Electric submitted this product for independent testing and qualification by third-party listing agencies. These agencies have certified this product as meeting the following standards.

#### **Agency Certifications**

The HMIGTO is manufactured in accordance with:

- Standard UL 508 and CSA C22.2 nº142 for Industrial Control Equipment
- Standard ANSI/ISA 12.12.01 and CSA C22.2 n<sup>o</sup>213 for Electrical Equipment for Use in Class I, Division 2 Hazardous Locations

#### NOTE:

- For use in Pollution Degree 2 environments.
- For use on a flat surface of a Type 1, Type 4X (Indoor Use Only) or Type 13 Enclosure.
- 24 Vdc input panel must be used with a Class 2 power supply.
- Suitable for use in Class I, Division 2 Groups A, B, C, and D Hazardous Locations.
- GOST certification.

Please refer to product markings.

- ATEX certification by Technical Inspection Association.
  - Please refer to product label.
- Merchant Navy rules. (Except Magelis GTOxxx5.)

Products are designed to comply with Merchant Navy rules.

Please refer to the Schneider Electric Web site for Merchant Navy rules installation guidelines.

- Standard EN1672-2 (Magelis GTOxxx5).
- FDA regulation 21 CFR 177 (Magelis GTOxxx5).

Refer to the Schneider Electric web site for installation guidelines.

For detailed information, contact your local distributor or see the catalog & marking on the product.

#### **Hazardous Substances**

The HMIGTO is a device for use in factory systems. When using the HMIGTO in a system, the system should comply with the following standards in regards to the installation environment and handling:

- WEEE, Directive 2002/96/EC
- RoHS, Directive 2011/65/EU
- RoHS China, Standard SJ/T 11363-2006

#### **CE Markings**

This product conforms to the necessary requirements of the following Directives for applying the CE label:

- 2006/95/EC Low Voltage Directive
- 2004/108/EC EMC Directive

This conformity is based on compliance with EN61000-6-4, EN61000-6-2

#### **A** DANGER

#### POTENTIAL FOR EXPLOSION

- Verify that the power, input and output (I/O) wiring are in accordance with Class I, Division 2 wiring methods.
- Substitution of any component may impair suitability for Class I, Division 2.
- Do not connect or disconnect equipment unless power has been switched off or the area is known to be non-hazardous.
- Securely lock externally connected units and each interface before turning on the power supply.
- Do not use, connect, or disconnect USB cable unless area is known to be non-hazardous.
- Do not disconnect while circuit is live or unless the area is known to be free of ignitable concentrations.
- Potential electrostatic charging hazard. Wipe the front panel of the terminal with a damp cloth before turning ON.

Failure to follow these instructions will result in death or serious injury.

#### **KC Markings**

해당 무선설비는 운용 중 전파혼신 가능성이 있음 사용자안내문

기 종 별	사용자안내문
A급 기기 (업무용 방송통신기자재)	이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적 으로 합니다.

해당 무선설비는 전파혼신 가능성이 있으므로 인명안전과 관련된 서비스는 할 수 없습니다

#### **GTO Series of Panels**

#### Critical systems, alarms and handling Requirements

Critical alarm indicators and system functions require independent and redundant protection hardware and/or mechanical interlocks.

When you cycle power, wait at least 10 seconds before restoring the power to the panel after it has been turned off. Switching the power OFF and ON quickly can damage the panel.

In the event the screen cannot be properly read, for example, if the backlight is not functioning, it may be difficult or impossible to identify a function. Functions that may present a hazard if not immediately executed, such as a fuel shut-off, must be provided independently of the panel. The machine's control system design must take into account the possibility of the backlight no longer functioning and the operator being unable to control the machine or making mistakes in the control of the machine.

#### **A WARNING**

#### LOSS OF CONTROL

- The designer of any control scheme must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.
- The machine control system design must take into account the possibility of the backlight no longer functioning and the operator being unable to control the machine, or making errors in the control of the machine.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

#### **WARNING**

#### UNINTENDED EQUIPMENT OPERATION

- Do not use this equipment as the only means of control for critical system functions such as motor start/stop or power control.
- Do not use this equipment as the only notification device for critical alarms, such as device overheating or overcurrent.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

#### Handling the LCD panel

The following characteristics are specific to the LCD panel and are considered normal behavior:

- LCD screen may show unevenness in the brightness of certain images or may appear different when seen from outside the specified viewing angle. Extended shadows, or crosstalk may also appear on the sides of screen images.
- LCD screen pixels may contain black and white colored spots and color display may seem to have changed.
- When the same image is displayed on the screen for a long period, an afterimage may appear when the image is changed.

**NOTE:** Change the screen image periodically and try not to display the same image for a long period of time.

#### **A** CAUTION

#### **SERIOUS EYE AND SKIN INJURY**

The liquid in the LCD panel contains an irritant:

- Avoid direct skin contact with the liquid.
- · Wear gloves when you handle a broken or leaking unit.
- Do not use sharp objects or tools in the vicinity of the LCD touch panel.
- Handle the LCD panel carefully to prevent puncture, bursting, or cracking of the panel material.

Failure to follow these instructions can result in injury or equipment damage.

If the panel is damaged and any liquid comes in contact with your skin, immediately rinse the area with running water for at least 15 minutes. If the liquid gets in your eyes, immediately rinse your eyes with running water for at least 15 minutes and consult a doctor.

# **Chapter 2**

### **Device Connectivity**

#### Introduction

This chapter presents the equipment you can connect to the panel.

#### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
System Design	16
Accessories	21

#### **System Design**

#### Introduction

The following diagrams represent equipment you can connect to the panel.

	COM1	COM2
HMIGTO1300	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO1310	RS-232C / RS-485 (see page 18)	-
HMIGTO2300	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO2310	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO2315	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO3510	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO4310	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO5310	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO5315	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO6310	RS-232C (see page 16)	RS-485 (see page 19)
HMIGTO6315	RS-232C (see page 16)	RS-485 (see page 19)

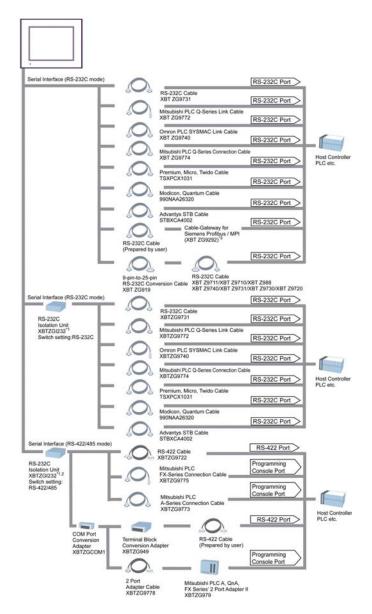
#### **RUN Mode Peripherals - RS-232C**

#### **A** CAUTION

#### **LOSS OF POWER**

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put
  excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

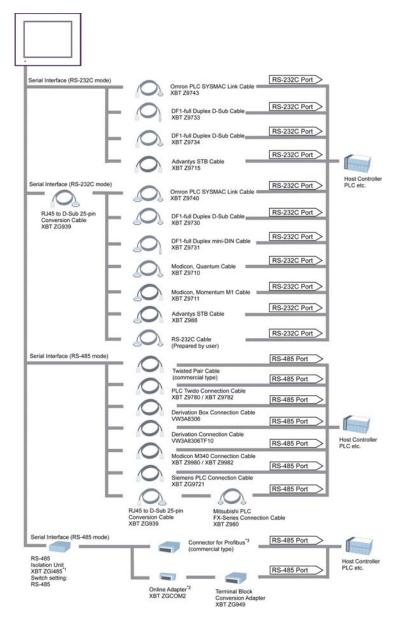


<sup>\*1</sup> When connecting the XBTZGI232, the COM port's pin 9 setting should be VCC. You can define COM port settings in Vijeo Designer or in the HMIGTO's offline menu.

<sup>\*2</sup> The RS-232C Isolation Unit works with only RS-422/485 (4 wire) communication.

<sup>\*3</sup> Cable-Gateway for Siemens Profibus / MPI (XBT ZG9292) is not supported by HMIGTO1310.

#### RUN Mode Peripherals - RS-232C / RS-485



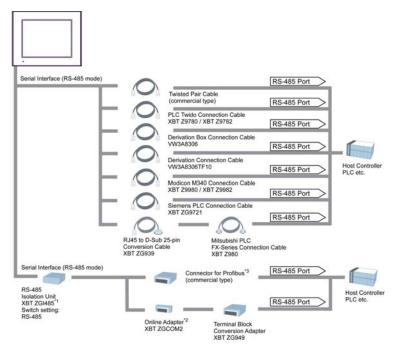
<sup>\*1</sup> Use the RS-485 Isolation Unit's USB port to supply power to itself. There is no need to set up a separate power supply.

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<sup>\*2</sup> In 1:n, n:1, or n:m communication, you can use the online adapter as a terminal. (Use 1 unit in either communication setup.)

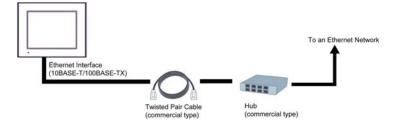
<sup>\*3</sup> The connector has a switch to control the terminal. Turn on the switch to enable communication.

#### **RUN Mode Peripherals - RS-485**



<sup>\*1</sup> Use the RS-485 Isolation Unit's USB port to supply power to itself. There is no need to set up a separate power supply.

#### **RUN Mode Peripherals - Ethernet Communication**

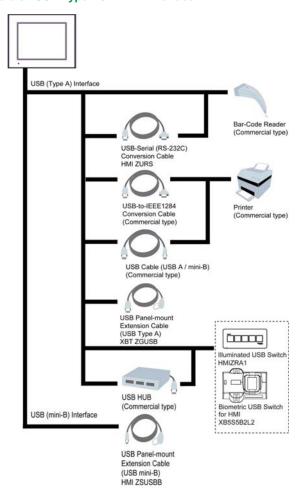


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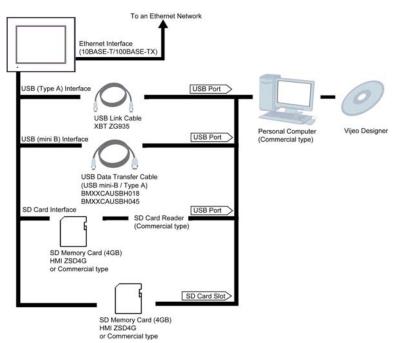
 $<sup>^{*2}</sup>$  In 1:n, n:1, or n:m communication, you can use the online adapter as a terminal. (Use 1 unit in either communication setup.)

 $<sup>^{\</sup>star3}$  The connector has a switch to control the terminal. Turn on the switch to enable communication.

#### RUN Mode Peripherals - USB Type A / mini-B Interface



#### **Edit Mode Peripherals**



#### **Accessories**

#### **Serial Interface Items**

Product Name	Product Number	Description	
RS-232C Cable	XBT ZG9731	Connects a host controller to the panel. (RS-232C)	
RS-422 Cable	XBT ZG9722	Connects a host controller to the panel. (RS-422)	
Mitsubishi PLC Q-Series Link Cable	XBT ZG9772	Connects Mitsubishi PLC Q-Series (or other host controller) to the panel. (RS-232C)	
Omron PLC SYSMAC Link Cable	XBT ZG9740 XBT Z9743 XBT Z9740	Connects Omron PLC SYSMAC Series unit (or other host controller) to the panel. (RS-232C)	
Mitsubishi PLC A-Series Connection Cable	XBT ZG9773	Connects Mitsubishi PLC A or QnA Series programming console I/F to panel. (Simultaneous use of programming consoles is not possible.)	
Mitsubishi PLC Q-Series Connection Cable	XBT ZG9774	Connects Mitsubishi PLC Q-Series programming console I/F to panel. (Simultaneous use of programming consoles is not possible.)	
Mitsubishi PLC FX-Series Connection Cable	XBT ZG9775 XBT Z980	Connects Mitsubishi PLC FX-Series programming console I/F and panel. (Simultaneous use of programming consoles is not possible.)	
Premium, Micro, Twido Cable	TSXPCX1031	Connects Premium, Micro, or Twido to the panel.	
Modicon, Quantum Cable	990NAA26320 XBT Z9710	Connects Modicon or Quantum to the panel.	
2 Port Adapter Cable	XBT ZG9778	Connects Mitsubishi PLC directly to the panel (D-sub 9 pin plug) using 2 port adapter II (RS-422).	
Mitsubishi PLC A, QnA, FX Series 2 Port Adapter II	XBT ZG979	Enables simultaneous use of a panel and a Mitsubishi PLC A, QnA, or FX Series peripheral device.	
Advantys STB Cable	STBXCA4002 XBT Z9715 XBT Z988	Connects Advantys STB to panel.	
Terminal Block Conversion Adapter	XBT ZG949	Connects output from a panel's Serial Interface (D-sub 9 pin plug) directly with an RS-422 terminal block.	
COM Port Conversion Adapter	XBT ZGCOM1	Connects optional RS-422 communication items to panel's COM1 port.	
DF1-full Duplex D-Sub Cable	XBT Z9730 XBT Z9733 XBT Z9734	Connects DF1-full Duplex to HMIGTO.	
DF1-full Duplex mini-DIN Cable	XBT Z9731 XBT Z9720	Connects DF1-full Duplex to HMIGTO.	
Modicon, Momentum M1 Cable	XBT Z9711	Connects Modicon, Momentum M1 to HMIGTO.	
PLC Twido Connection Cable	XBT Z9780 / XBT Z9782	Connects PLC Twido to HMIGTO.	
Derivation Box Connection Cable	VW3A8306	Connects Derivation Box to HMIGTO.	
Derivation Connection Cable	VW3A8306TF10	Connects Derivation to HMIGTO.	
Modicon M340 Connection Cable	XBT Z9980 / XBT Z9982	Connects Modicon M340 to HMIGTO.	
Siemens PLC Connection Cable	XBT ZG9721	Connects Siemens PLC to HMIGTO.	
RS-232C Isolation Unit	XBT ZGI232	Connects a host controller to HMIGTO with isolation. (RS-232C and RS-422 are switchable.)	
RS-485 Isolation Unit	XBT ZGI485	Connects a host controller to HMIGTO with isolation.	
Cable-gateway for Siemens Profibus / MPI	XBT ZG9292	Connects Siemens Profibus / MPI units to HMIGTO.	
RJ45 to D-Sub 25 pin Conversion Cable	XBT ZG939	Connects a RJ45 cable to HMIGTO (D-sub 9 pin plug).	
9-pin to 25-pin RS-232C Conversion Cable	XBT ZG919	Connects a standard RS-232C cable (D-Sub 25-pin socket) to HMIGTO (D-sub 9 pin plug).	
Online Adapter	XBT ZGCOM2	Terminal adapter for RS-485 communication.	

#### **USB** Interface Items

Product Name	Product Number	Description
USB Transfer Cable	XBT ZG935	Downloads project data created with the software via the panel's USB I/F.
USB Front Cable	XBT ZGUSB	Extension cable attaching USB interface to front panel.
USB-Serial (RS-232C) Conversion Cable	HMIZURS	Cable for converting a panel's USB interface into a serial interface (RS-232C).
		Allows connection to modems*1 or bar code readers*1 that support RS-232C.
USB Transfer Cable (USB Type A/mini-B)	BMXXCAUSBH018 BMXXCAUSBH045	Cable for transferring screen data from a PC (USB Type A) to the panel (USB mini-B).
Remote USB port location for mini-USB	HMIZSUSBB XBT ZGUSBB	Extension cable that attaches to the USB (mini-B) interface on the front side of the operation panel.
Illuminated USB Switch	HMIZRA1	A unit of 5 illuminated switches with multiple color LED easily connected with HMIGTO via USB.
Biometric USB Switch for HMI	XB5S5B2L2	Fingerprint recognition unit easily connected with HMIGTO via USB.

#### Software

Product name	Description
Vijeo Designer (Version 6.1 or later)	Software you install on your computer to create project data for your HMIGTO.

#### **SD Card Items**

Product Name	Product Number	Description	
SD Memory Card (4 GB)	HMIZSD4G	SD Memory Card (4 GB, CLASS4)	

#### **Option Items**

Product Name	Product Number	Corresponding panel	Description
12.1-inch Screen Protection Sheet	XBT ZG66	HMIGTO6310/6315	Disposable, dirt-resistant sheet for the HMIGTO screen (5 sheets/set)
10.4-inch Screen Protection Sheet	XBT ZG65	HMIGTO5310/5315	
7.5-inch Screen Protection Sheet	XBT ZG64	HMIGTO4310	
7.0-inch Wide Screen Protection Sheet	XBT ZG63	HMIGTO3510	
5.7-inch Screen Protection Sheet	XBT ZG62	HMIGTO2300/2310/2315	
3.5-inch Screen Protection Sheet	XBT ZG60	HMIGTO1300/1310	
12.1-inch Environment Cover	XBT ZECOV6	HMIGTO6310	Disposable, environment cover for
10.4-inch Environment Cover	XBT ZECOV5	HMIGTO5310	the HMIGTO screen (1 sheet/set)
7.0/7.5-inch Environment Cover	XBT ZECOV4	HMIGTO3510/4310	
5.7-inch Environment Cover	XBT ZECOV2	HMIGTO2300/2310	
3.5-inch Environment Cover	XBT ZECOV1	HMIGTO1300/1310	

#### **Maintenance Options**

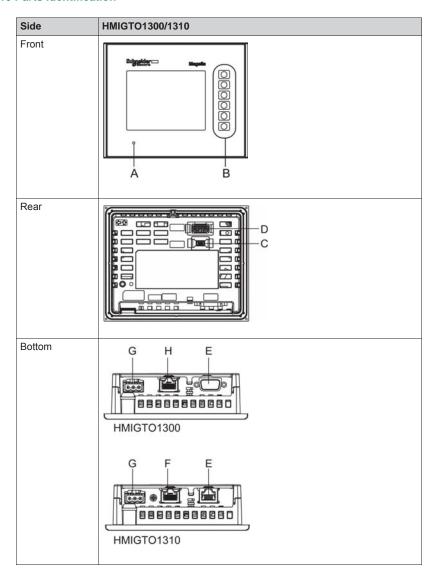
Product Name	Product Number	Corresponding panel	Description
Installation Fastener	HMI ZGFIX	HMIGTO except HMIGTO2315/5315/6315	Used to install the HMIGTO into a solid panel (4 pieces/set)
Installation System	HMI ZGFIX2	HMIGTO2315/5315/6315	Used to install the HMIGTO into a solid panel. Brackets (4 pieces/set) M4 Hex nuts (8 pieces/set)
12.1-inch Installation Gasket	HMI ZG56	HMIGTO6310	Provides dust and moisture resistance when HMIGTO is installed into a solid panel (1 piece)
	HMI ZG562	HMIGTO6315	
10.4-inch Installation Gasket	HMI ZG55	HMIGTO5310	
	HMI ZG552	HMIGTO5315	
7.0-inch Wide & 7.5-inch Installation Gasket	HMI ZG54	HMIGTO3510/4310	
5.7-inch Installation Gasket	HMI ZG52	HMIGTO2300/2310	
	HMI ZG522	HMIGTO2315	
3.5-inch Installation Gasket	HMI ZG51	HMIGTO1300/1310	
USB Clamp TypeA (1 port)	HMI ZGCLP1	Magelis GTO	Clamp to prevent disconnection of USB cable (USB/A, 1 port, 5 clamps/set)
USB Clamp mini-B (1 port)	HMI ZGCLP3	Magelis GTO	Clamp to prevent disconnection of USB cable (USB/mini-B, 1 port, 5 clamps/set)
DC Power Supply Connector	HMI ZGPWS	HMIGTO3510/4310 HMIGTO2300/2310/2315 HMIGTO1300/1310	Connector to connect DC power supply cables (5 pcs/set)
DC Power Supply Connector (Right-angle)	HMI ZGPWS2	HMIGTO6310/6315 HMIGTO5310/5315	Right-angle connector to connect DC power supply cables (5 pcs/set)
Battery for Memory Backup	HMI ZGBAT	HMIGTO (except HMIGTO1300/1310/2300)	Primary battery for memory and time data backup
Panel Cutout Adapter	XBT ZGGCO4	HMIGTO5310	Panel cutout adapter for mounting HMIGTO5310 in cutout for XBT GT5230.
Insert Label	HMI ZLYGO3	HMIGTO3510	Label insert for HMIGTO 7-inch Wide models.
	HMI ZLYGO1	HMIGTO1300/1310	Label insert for HMIGTO 3.5-inch models

# **Chapter 3**

# **Parts Identification and Functions**

# **Parts Identification and Functions**

### **HMIGTO1300/1310 Parts Identification**



Part	Name	Description
Α	Status LED	*1
В	Function Switches	Six switches (F1 to F6). You can define operations for these switches using Vijeo Designer.
С	USB (mini-B) Interface	Conforms to USB2.0 (mini-B) x 1. Communication Distance: 5 m (16.4 ft) or less.
D	USB (Type A) Interface	Conforms to USB2.0 (Type A) x 1. Power supply voltage: 5Vdc+/-5%. Output Current: 500 mA or less. Maximum communication distance: 5 m (16.4 ft).
E	Serial Interface (COM1)	HMIGTO1300: RS-232C Serial Interface. Connector: D-Sub 9 pin (plug) x 1. HMIGTO1310: RS-232C/485 Serial Interface. (You can switch the communication method via software.) Connector: Modular jack (RJ-45).

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Part	Name	Description
F	Ethernet Interface*2	Ethernet transmission interface (10BASE-T/100BASE-TX) Connector: Modular jack (RJ-45) x 1. Ethernet Interface is not attached to HMIGTO1300.
G	Power Plug Connector	-
Н	Serial Interface (COM2)	HMIGTO1300: RS-485 Serial Interface. Connector: Modular jack (RJ-45) x 1.

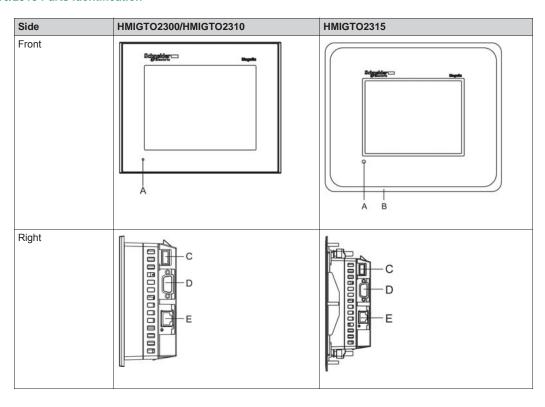
<sup>\*1</sup> Status LED operations are as shown below:

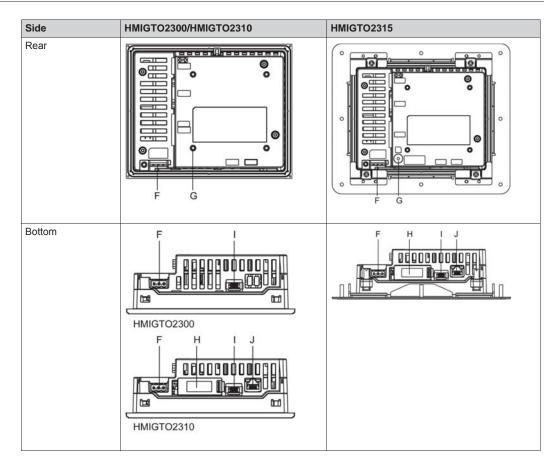
Color	Indicator	Description
Green	ON	Offline
		In operation
Orange	Flashing	Software starting up.
Red	ON	Power is turned ON.
-	OFF	Power is turned OFF.

 $<sup>\</sup>ensuremath{^{*2}}$  Ethernet LED operations are as shown below.

BASE-T/100BASE-TX.
nission failure.

### HMIGTO2300/2310/2315 Parts Identification





Part	Name	Description	
Α	Status LED	*1	
В	Stainless Steel Bezel	HMIGTO2315 only.	
С	USB (Type A) Interface	Conforms to USB2.0 (Type A) x 1. Power supply voltage: 5Vdc+/-5%. Output Current: 500 mA or less. Maximum communication distance: 5 m (16.4 ft).	
D	Serial Interface (COM1)	RS-232C Serial Interface. Connector: D-Sub 9 pin (plug) x 1.	
Е	Serial Interface (COM2)*2	RS-485 Serial Interface. Connector: Modular jack (RJ-45).	
F	Power Plug Connector	-	
G	SD Card Access LED *3	This lamp lights up when SD Card is inserted. For more information, refer to SD Card Insertion/Removal (see page 131).	
		NOTE: SD Card Access LED is not available on HMIGTO2300.	
Н	SD Card Interface Cover/Replacement Battery Insertion Cover	For information on how to open the cover, and insert or remove the SD Card, refer to SD Card Insertion / Removal (see page 131).  For information on how to open the cover and replace the battery, refer to Replacing the Primary Battery (see page 146).	
		NOTE: This cover is not on HMIGTO2300.	
I	USB (mini-B) Interface	Conforms to USB2.0 (mini-B) x 1. Communication Distance: 5 m (16.4 ft) or less.	
J	Ethernet Interface *4	Ethernet transmission interface (10BASE-T/100BASE-TX) Connector: Modular jack (RJ-45) x 1.	
		NOTE: Ethernet Interface is not available on HMIGTO2300.	

\*1 Status LED operations are as shown below:

Color	Indicator	Description
Green	ON	Offline
		In operation
Orange	Flashing	Software starting up.
Red	ON	Power is turned ON.
-	OFF	Power is turned OFF.

<sup>\*2</sup> COM2 LED operations are as shown below.

Color	Indicator	Description
Yellow	ON	Communication (sending or receiving data) is occurring.
	OFF	No communication.

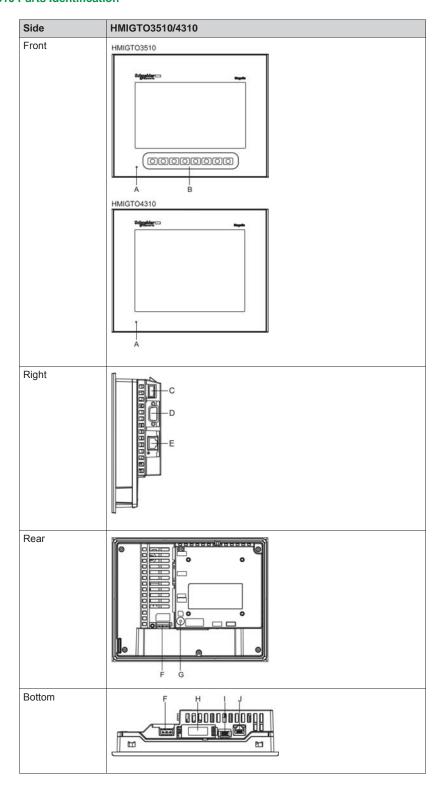
 $<sup>^{\</sup>star3}$  SD Card Access LED operations are as shown below.

Color	Indicator	Description
Green (Active)	ON	The SD Card is inserted.
	OFF	The SD Card is not inserted or is not being accessed.

<sup>\*4</sup> Ethernet LED operations are as shown below.

	Color	Indicator	Description
Link	Green (Active)	Flashing	Data transmission is occurring.
		OFF	No data transmission.
15mm	Green (Link)	ON	Data transmission is available in 10BASE-T/100BASE-TX.
Active		OFF	No connection or subsequent transmission failure.

### **HMIGTO3510/4310 Parts Identification**



Part	Name	Description
Α	Status LED	*1
В	Function Switches	HMIGTO3510 only. Eight switches (F1 to F8). You can define operations for these switches using Vijeo Designer.
С	USB (Type A) Interface	Conforms to USB2.0 (Type A) x 1. Power supply voltage: 5 Vdc+/-5%. Output Current: 500 mA or less. Maximum communication distance: 5 m (16.4 ft).
D	Serial Interface (COM1)	RS-232C Serial Interface. Connector: D-Sub 9 pin (plug) x 1.
Е	Serial Interface (COM2)*2	RS-485 Serial Interface. Connector: Modular jack (RJ-45) x 1.
F	Power Plug Connector	-
G	SD Card Access LED *3	This lamp lights up when SD Card is inserted. For more information, refer to SD Card Insertion / Removal (see page 131).
Н	SD Card Interface Cover/Replacement Battery Insertion Cover	For information on how to open the cover, and insert or remove the SD Card, refer to SD Card Insertion / Removal (see page 131).  For information on how to open the cover and replace the battery, refer to Replacing the Primary Battery (see page 146).
I	USB (mini-B) Interface	Conforms to USB2.0 (mini-B) x 1. Communication Distance: 5 m (16.4 ft) or less.
J	Ethernet Interface *4	Ethernet transmission interface (10BASE-T/100BASE-TX) Connector: Modular jack (RJ-45) x 1.

<sup>\*1</sup> Status LED operations are as shown below:

Color	Indicator	Description
Green	ON	Offline
		In operation
Orange	Flashing	Software starting up.
Red	ON	Power is turned ON.
-	OFF	Power is turned OFF.

 $<sup>^{\</sup>ast 2}$  COM2 LED operations are as shown below.

Color	Indicator	Description
Yellow	ON	Communication (sending or receiving data) is occurring.
	OFF	No communication.

 $<sup>^{\</sup>ast 3}$  SD Card Access LED operations are as shown below.

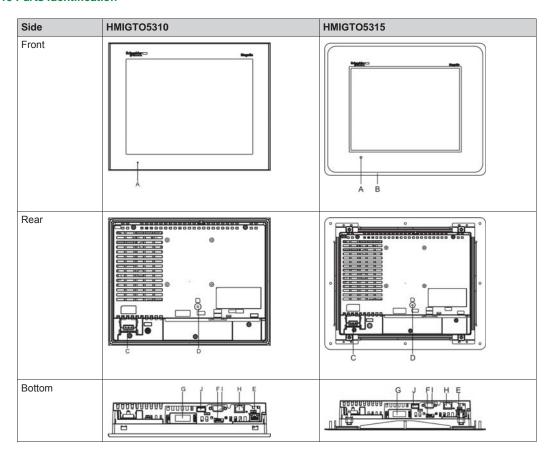
Color	Indicator	Description
Green (Active)	ON	The SD Card is inserted.
	OFF	The SD Card is not inserted or is not being accessed.

<sup>\*4</sup> Ethernet LED operations are as shown below.

	Color	Indicator	Description
LINK	Green (Active)	Flashing	Data transmission is occurring.
		OFF	No data transmission.
	Green (Link)	ON	Data transmission is available in 10BASE-T/100BASE-TX.
Active		OFF	No connection or subsequent transmission failure.

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### **HMIGTO5310/5315 Parts Identification**



Part	Name	Description
Α	Status LED	*1
В	Stainless Steel Bezel	HMIGTO5315 only.
С	Power Plug Connector	-
D	SD Card Access LED *2	This lamp lights up when SD Card is inserted.
		<b>NOTE:</b> Do not remove or insert the SD Card when the LED lamp is on. Doing so may damage data on the SD Card.
E	Ethernet Interface *3	Ethernet transmission interface (10BASE-T/100BASE-TX) Connector: Modular jack (RJ-45) x 1.
F	USB (mini-B) Interface	Conforms to USB2.0 (mini-B) x 1. Communication Distance: 5 m (16.4 ft) or less.
G	SD Card Interface Cover/Replacement Battery Insertion Cover	For information on how to open the cover, and insert or remove the SD Card, refer to SD Card Insertion/Removal (see page 131).  For information on how to open the cover and replace the battery, refer to Replacing the Primary Battery (see page 146).
Н	Serial Interface (COM2)*4	RS-485 Serial Interface. Connector: Modular jack (RJ-45).
I	Serial Interface (COM1)	RS-232C Serial Interface. Connector: D-Sub 9 pin (plug) x 1.
J	USB (Type A) Interface	Conforms to USB2.0 (Type A) x 1. Power supply voltage: 5Vdc+/-5%. Output Current: 500 mA or less. Maximum communication distance: 5 m (16.4 ft).

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\*1 Status LED operations are as shown below:

Color	Indicator	Description
Green	ON	Offline
		In operation
Orange	Flashing	Software starting up.
Red	ON	Power is turned ON.
-	OFF	Power is turned OFF.

<sup>\*2</sup> SD Card Access LED operations are as shown below.

Color	Indicator	Description
Green (Active)	ON	The SD Card is inserted.
	OFF	The SD Card is not inserted or is not being accessed.

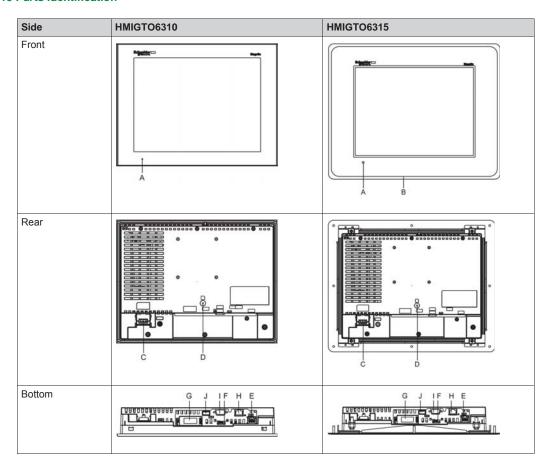
<sup>\*3</sup> Ethernet LED operations are as shown below.

	Color	Indicator	Description
Link	Green (Active)	Flashing	Data transmission is occurring.
		OFF	No data transmission.
	Green (Link)	ON	Data transmission is available in 10BASE-T/100BASE-TX.
Active		OFF	No connection or subsequent transmission failure.

 $<sup>^{*4}</sup>$  COM2 LED operations are as shown below.

Color	Indicator	Description
Yellow	ON	Communication (sending or receiving data) is occurring.
	OFF	No communication.

### **HMIGTO6310/6315 Parts Identification**



Part	Name	Description
Α	Status LED	*1
В	Stainless Steel Bezel	HMIGTO6315 only.
С	Power Plug Connector	-
D	SD Card Access LED *2	This lamp lights up when SD Card is inserted.
		<b>NOTE:</b> Do not remove or insert the SD Card when the LED lamp is on. Doing so may damage data on the SD Card.
E	Ethernet Interface *3	Ethernet transmission interface (10BASE-T/100BASE-TX) Connector: Modular jack (RJ-45) x 1.
F	USB (mini-B) Interface	Conforms to USB2.0 (mini-B) x 1. Communication Distance: 5 m (16.4 ft) or less.
G	SD Card Interface Cover/Replacement Battery Insertion Cover	For information on how to open the cover, and insert or remove the SD Card, refer to SD Card Insertion/Removal (see page 131).  For information on how to open the cover and replace the battery, refer to Replacing the Primary Battery (see page 146).
Н	Serial Interface (COM2)	RS-485 Serial Interface. Connector: Modular jack (RJ-45)
I	Serial Interface (COM1)	RS-232C Serial Interface. Connector: D-Sub 9 pin (plug) x 1.
J	USB (Type A) Interface	Conforms to USB2.0 (Type A) x 1. Power supply voltage: 5Vdc+/-5%. Output Current: 500 mA or less. Maximum communication distance: 5 m (16.4 ft).

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\*1 Status LED operations are as shown below:

Color	Indicator	Description
Green	ON	Offline
		In operation
Orange	Flashing	Software starting up.
Red	ON	Power is turned ON.
-	OFF	Power is turned OFF.

 $<sup>^{*2}</sup>$  SD Card Access LED operations are as shown below.

Color	Indicator	Description
Green (Active)	ON	The SD Card is inserted.
	OFF	The SD Card is not inserted or is not being accessed.

 $<sup>^{\</sup>star3}$  Ethernet LED operations are as shown below.

	Color	Indicator	Description
Link	Green (Active)	Flashing	Data transmission is occurring.
		OFF	No data transmission.
	Green (Link)	ON	Data transmission is available in 10BASE-T/100BASE-TX.
Active		OFF	No connection or subsequent transmission failure.

<sup>\*4</sup> COM2 LED operations are as shown below.

Color	Indicator	Description	
Yellow	ON	Communication (sending or receiving data) is occurring.	
	OFF	No communication.	

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# **Chapter 4** Specifications

### Overview

This chapter presents the HMIGTO specifications.

# What Is in This Chapter?

This chapter contains the following sections:

Section	Торіс	Page
4.1	HMIGTO1300/1310	36
4.2	HMIGTO2300/2310/2315	50
4.3	HMIGTO3510/4310	68
4.4	HMIGTO5310/5315	84
4.5	HMIGTO6310/6315	101

# Section 4.1 HMIGTO1300/1310

# What Is in This Section?

This section contains the following topics:

Торіс	Page
Electrical Specifications	37
Environmental Specifications	38
Structural Specifications	39
Display Specifications	40
Memory, Clock, Touch Panel and Function Switches	41
Interface Specifications	42
Specifications of Serial Interface COM1	43
Specifications of Serial Interface COM2	45
Dimensions	46

# **Electrical Specifications**

	Rated Input Voltage		24 Vdc	
	Input Voltage Limits		19.228.8 Vdc	
	Voltage Drop		2 ms or less	
	Power Consumption		9.6 W or less	
ply		When power is not supplied to external devices	5.2 W or less	
Supply		Backlight OFF (Standby Mode)	4.2 W or less	
Power		Backlight Dimmed (Brightness: 20%)	4.3 W or less	
Po	In-Rush Current		30 A or less	
Voltage Endurance			1,000 Vac 20 mA for 1 minute (between charging and FG terminals)	
Ins	Insulation Resistance		500 Vdc, 10 M $\Omega$ or more (between charging and FG terminals)	

# **Environmental Specifications**

	Surrounding Air Temperature	050 °C (32122 °F)	
	Storage Temperature	-2060 °C (-4140 °F)	
ent	Surrounding Air and Storage Humidity	10%90% RH (Non condensing, wet bulb temperature 39 $^{\circ}$ C [102.2 $^{\circ}$ F] or less)	
uuo.	Dust	0.1 mg/m <sup>3</sup> (10 <sup>-7</sup> oz/ft <sup>3</sup> ) or less (non-conductive levels)	
invir	Pollution Degree	For use in Pollution Degree 2 environment	
la E	Corrosive Gases	Free of corrosive gases	
Physical Environment	Atmospheric Pressure (Operating Altitude)	8001,114 hPa (2,000 m [6,561 ft] or lower)	
nvironment	Vibration Resistance	IEC/EN 61131-2 compliant 59 Hz Single amplitude 3.5 mm (0.14 in.) 9150 Hz Fixed acceleration: 9.8 m/s <sup>2</sup> X, Y, Z directions for 10 cycles (approx. 100 min.)	
Mechanical Environment	Concussion Resistance	IEC/EN 61131-2 compliant 147 m/s <sup>2</sup> , X, Y, Z directions for 3 times	
Electrical Environment	Noise immunity	Noise Voltage: 1,000 Vp-p Pulse Width: 1 μs Rise Time: 1 ns (via noise simulator)	
Electrical E	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV (IEC/EN 61000-4-2 Level 3)	

# Air quality requirements

Do not operate or store the panel where chemicals evaporate, or where chemicals are present in the air:

- Corrosive chemicals: Acids, alkalines, liquids containing salt.
- Flammable chemicals: Organic solvents.

# **A** CAUTION

### **INOPERATIVE EQUIPMENT**

Do not allow water, liquids, metal, and wiring fragments to enter the panel case.

Failure to follow these instructions can result in injury or equipment damage.

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### **Structural Specifications**

Grounding	Functional grounding: Grounding resistance of $100\Omega$ , $2\text{mm}^2$ (AWG 14) or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)
Cooling Method	Natural air circulation
Structure *1	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)
External Dimensions	W132 x H106 x D42 mm (W5.2 x H4.17 x D1.65 in.)
Panel Cut Dimensions	W118.5 x H92.5 mm (W4.67 x H3.64 in.)* <sup>2</sup> Panel thickness area: 1.65 mm (0.060.2 in)* <sup>3</sup>
Weight	0.4 kg (0.9 lb) or less (main unit only)

<sup>\*1</sup> The front face of the HMIGTO, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification. Even though the HMIGTO's level of resistance is equivalent to these standards, oils that should have no effect on the HMIGTO can possibly harm the panel. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the panel for long periods of time. If the panel's front face protection sheet peels off, these conditions can lead to the ingress of oil into the panel and separate protection measures are suggested.

Also, if non-approved oils are present, they may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the panel, be sure to confirm the type of conditions that will be present in the panel's operating environment. If the installation gasket is used for a long period of time, or if the panel and its gasket are removed from the panel, the original level of protection cannot be kept. To maintain the original protection level, be sure to replace the installation gasket regularly.

The front face of the panel, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification.

# **A** CAUTION

#### **EQUIPMENT DAMAGE**

Ensure that the panel is not in permanent and direct contact with oils.

Failure to follow these instructions can result in injury or equipment damage.

# NOTICE

#### STORAGE AND OPERATION OUTSIDE OF SPECIFICATIONS

- Store the panel in areas where temperatures are within the panel's specifications.
- Do not restrict or block the panel's rear-face ventilation slots.

Failure to follow these instructions can result in equipment damage.

# **NOTICE**

#### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

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<sup>\*2</sup> For dimensional tolerance, everything +1/-0 mm (+0.04/-0 in.) and R in angle are below R3 (R0.12 in.)

<sup>\*3</sup> Even if the installation wall thickness is within the recommended range for the "Panel Cut Dimensions", depending on wall's material, size, and installation location of the panel and other devices, the installation wall could warp. To prevent warping, the installation surface may need to be strengthened.

# **Display Specifications**

		HMIGTO1310	HMIGTO1300
Display Type		TFT Color LCD	
Display Size		3.5"	
Resolution		320 x 240 pixels (QVGA)	
Effective Display	Area	W70.56 x H52.92 mm (W2.78 x H2.08 in.)	
Display Colors		65,536 colors (No blink) / 16,384 colors (Blink)	
Backlight		White LED (Not user replaceable. When local distributor.)	replacement is required, contact your
Backlight Service Life		50,000 hours or more (continuous operation at 25 °C [77 °F] before backlight brightness decreased to 50%)	
Brightness Contro	ol	16 levels (Adjusted with touch panel or software	
Language Fonts		ASCII: (Code page 850) Alphanumeric (including European characters) Chinese: (GB2312-80 codes) Simplified Chinese fonts Japanese (except for XBT GT1000 series): ANK 158, Kanji: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) Korean: (KSC5601 - 1992 codes) Hangul fonts Taiwanese: (Big 5 codes) Traditional Chinese fonts	
Character sizes		8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts	
Font sizes		You can expand width up to 8 times, and expand height up to 8 times.*1	
Text 8 x 8 pixels 40 characters per row x 30 rows			
	8 x 16 pixels	40 characters per row x 15 rows	
16 x 16 pixels 32 x 32 pixels		20 characters per row x 15 rows	
		10 characters per row x 7 rows	

<sup>\*1</sup> You can set up other font sizes using the software.

# Memory, Clock, Touch Panel and Function Switches

#### **Memory**

	HMIGTO1310	HMIGTO1300
Application Memory *1	FLASH EPROM 96 MB	FLASH EPROM 64 MB
Application run DRAM	128 MB	128 MB
Data Backup	SRAM 512 KB (Rechargeable lithium battery for data backup)	SRAM 128 KB (Rechargeable lithium battery for data backup)

<sup>\*1</sup> Capacity available for user application.

#### NOTE:

- When the message "Battery level is low" is displayed, supply power to the panel and fully charge the battery. In 24 hours the battery charges to a level that allows backup operation. Completing a full charge requires about 120 hours (5 days).
- The lifetime of the rechargeable lithium battery is 10 years when the battery's ambient temperature is 40 °C (104 °F) or less, 4.1 years when the battery's ambient temperature is 50 °C (122 °F) or less, and 1.5 years when the battery's ambient temperature is 60 °C (140 °F) or less.
   When used for backup:

Approximately 100 days with a fully charged battery.

Approximately 6 days with a half-charged battery.

#### Clock

Clock Accuracy*1	±65 seconds/month (deviation at room temperature and power is OFF).

<sup>\*1</sup> Depending on the operating temperature and age of panel, the clock can deviate from -380 to +90 sec/month. For systems where this level of precision is insufficient, the user should monitor and make adjustments when required.

#### NOTE:

- When the message "Battery level is low" is displayed, supply power to the panel and fully charge the battery. In 24 hours the battery charges to a level that allows backup operation. Completing a full charge requires about 120 hours (5 days).
- The lifetime of the rechargeable lithium battery is 10 years when the battery's ambient temperature is 40 °C (104 °F) or less, 4.1 years when the battery's ambient temperature is 50 °C (122 °F) or less, and 1.5 years when the battery's ambient temperature is 60 °C (140 °F) or less.

When used for backup:

Approximately 100 days with a fully charged battery.

Approximately 6 days with a half-charged battery.

#### **Touch Panel**

Touch Panel Type	Resistive Film (analog)
Touch Panel Resolution	1,024 x 1,024
Touch Panel Service Life	1 million times or more

#### **Function Switches**

Six switches (F1 to F6).

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# **Interface Specifications**

# **Serial Interface COM1**

	HMIGTO1310	HMIGTO1300
Asynchronous Transmission	RS-232C / RS-485	RS-232C
Data Length	7 or 8 bits	
Stop Bit	1 or 2 bits	
Parity	None, odd or even	
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI) 2,400115,200 bps	
Connector	Modular jack (RJ-45)	D-Sub 9 pin (plug)

# **Serial Interface COM2**

	HMIGTO1300
Asynchronous Transmission	RS-485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI)
Connector	Modular jack (RJ-45)

### **USB** Interface

	USB (Type A) Interface	USB (mini-B) Interface
Connector	USB 2.0 (Type A) x 1	USB 2.0 (mini-B) x 1
Power Supply Voltage	5 Vdc ±5%	-
Maximum Current Supplied	500 mA	-
Maximum Transmission Distance	5 m (16.4 ft)	

### **Ethernet Interface**

	HMIGTO1310
Ethernet (LAN)	IEEE802.3i / IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ45) x 1

NOTE: HMIGTO1300 does not have an Ethernet interface.

### **Specifications of Serial Interface COM1**

#### Introduction

# **A** CAUTION

#### LOSS OF POWER

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **AA** DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- For HMIGTO1300, connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.
- For HMIGTO1310, connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM1**

HMIGTO1300: D-Sub 9 pin plug connector via an RS-232C cable.

Pin Connection	Pin No.	RS-232C		
		Signal Name	Direction	Meaning
	1	CD	Input	Carrier Detect
5 9	2	RD(RXD)	Input	Receive Data
	3	SD(TXD)	Output	Send Data
1 6	4	ER(DTR)	Output	Data Terminal Ready
	5	SG	-	Signal Ground
(Magelis	6	DR(DSR)	Input	Data Set Ready
GTO side)	7	RS(RTS)	Output	Request to Send
	8	CS(CTS)	Input	Send possible
	9	CI(RI)/VCC	Input/–	Called Status Display +5V±5% Output 0.25A
	Shell	FG	_	Frame Ground (Common with SG)

You can switch pin #9 between RI and VCC via software.

# NOTICE

#### **EQUIPMENT DAMAGE**

Use only the rated current.

Failure to follow these instructions can result in equipment damage.

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Interfit bracket is #4-40 (UNC).

# **A** CAUTION

#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9 pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

HMIGTO1310: RJ-45 connector via an RS-232C or RS-485 cable.

Pin Connection	Pin No.	RS-232C/RS-485		
		Signal Name	Direction	Meaning
1 8	1	RD(RXD)	Input	Receive Data (RS-232C)
	2	SD(TXD)	Output	Send Data (RS-232C)
	3	NC	_	_
	4	D1	Input/Output	Transfer Data (RS-485)
	5	D0	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request to Send
	7	NC	_	-
	8	SG	_	Signal Ground
	Shell	FG	_	Frame Ground (Common with SG)

# **A** CAUTION

#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

### **Specifications of Serial Interface COM2**

#### Introduction

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM2**

HMIGTO1300: RJ-45 connector via an RS-485 cable

NOTE: When setting up RS-485 communication, the cable diagram for some equipment may require polarization on the terminal side. This terminal does not require any special setting as it handles polarization automatically.

Pin Connection	Pin No.	RS-485		
		Signal Name	Direction	Meaning
1 8	1	NC	_	-
	2	NC	_	-
	3	NC	_	-
	4	Line A	Input/Output	Transfer Data (RS-485)
	5	Line B	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request to Send
	7	NC	_	-
	8	SG	_	Signal Ground

# **A** CAUTION

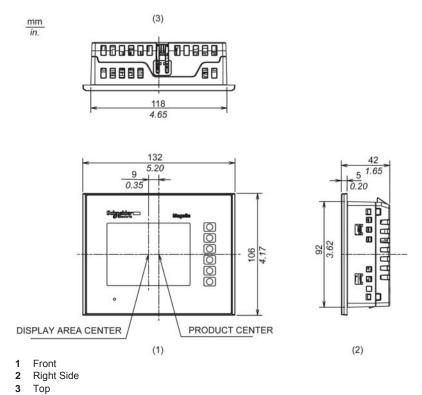
#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

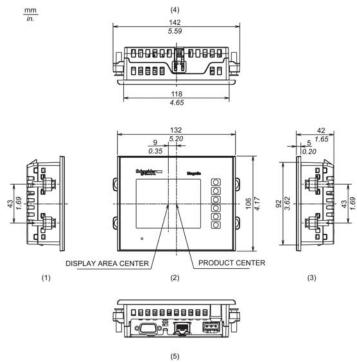
Failure to follow these instructions can result in injury or equipment damage.

# **Dimensions**

### **External Dimensions**

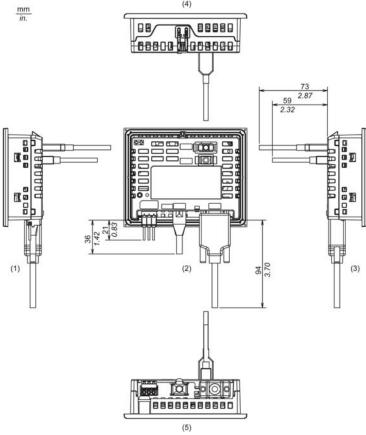


#### **Installation with Installation Fasteners**



- Left Side
- 2 Front
- 3 Right Side
- 4 Top
- Bottom

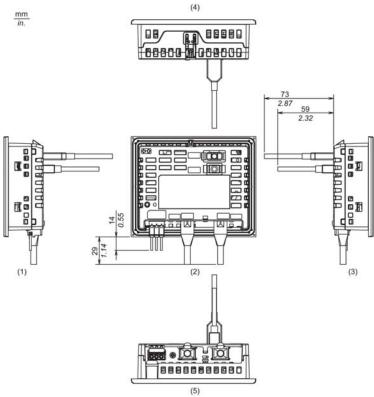
#### **Dimensions with Cables: HMIGTO1300**



- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

#### **Dimensions with Cables: HMIGTO1310**

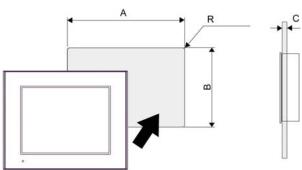


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

### **Panel Cut Dimensions**

Create a panel cut and insert the panel into the opening from the front.

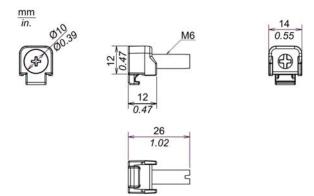


Α	В	С	R
118.5 mm (+1, -0 mm) (4.67 in [+0.04, -0 in.])	92.5 mm (+1, -0 mm) (3.64 in. [+0.04, -0 in.])	1.65 mm (0.060.2 in)	3 mm (0.12 in.) maximum

NOTE: Before designing the panel cut, refer to Installation (see page 120).

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# **Installation Fastener Dimensions**



# Section 4.2 HMIGTO2300/2310/2315

### What Is in This Section?

This section contains the following topics:

Торіс	Page
Electrical Specifications	51
Environmental Specifications	52
Structural Specifications	53
Display Specifications	55
Memory, Clock, and Touch Panel	56
Interface Specifications	57
Specifications of Serial Interface COM1	58
Specifications of Serial Interface COM2	60
Dimensions	61

# **Electrical Specifications**

	Rated Input Voltage		24 Vdc
	Input Voltage Limits		19.228.8 Vdc
	Voltage Drop		5 ms or less
	Power Consump	tion	10.5 W or less
		When power is not supplied to external devices	6.5 W or less
Supply		Backlight OFF (Standby Mode)	4.5 W or less
Power Sul	Backlight Dimmed (Brightness: 20%)		5 W or less
Po	In-Rush Current		30 A or less
Voltage Endurance			1,000 Vac, 20 mA for 1 minute (between charging and FG terminals)
Insulation Resistance		)	500 Vdc, 10 M $\Omega$ or more (between charging and FG terminals)

# **Environmental Specifications**

		HMIGTO2310 / HMIGTO2315	HMIGTO2300		
	Surrounding Air Temperature	055 °C (32 °F131 °F)	050 °C (32122 °F)		
	Storage Temperature	-2060 °C (-4140 °F)			
ent	Surrounding Air and Storage Humidity	1090% RH (Non condensing, wet bulb temperature 39 °C [102.2 °F] or less)			
muo.	Dust	0.1 mg/m <sup>3</sup> (10 <sup>-7</sup> oz/ft <sup>3</sup> ) or less (non	-conductive levels)		
invir	Pollution Degree	For use in Pollution Degree 2 envir	onment		
Sal E	Corrosive Gases	Free of corrosive gases			
Physical Environment	Atmospheric Pressure (Operating Altitude)	8001,114 hPa (2,000 m [6,561 ft] or lower)			
invironment	Vibration Resistance	IEC/EN 61131-2 compliant 59 Hz Single amplitude 3.5 mm (0.14 in.) 9150 Hz Fixed acceleration: 9.8 m/s <sup>2</sup> X, Y, Z directions for 10 cycles (approx. 100 min)			
Mechanical Environment	Concussion Resistance	IEC/EN 61131-2 compliant 147 m/s², X, Y, Z directions for 3 times			
ronment	Noise Immunity	Noise Voltage: 1,000 Vp-p Pulse Width: 1 μs Rise Time: 1 ns			
Electrical Environment	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV (IEC/EN 61000-4-2 Level 3)			

### Air quality requirements

Do not operate or store the panel where chemicals evaporate, or where chemicals are present in the air:

- Corrosive chemicals: Acids, alkalines, liquids containing salt.
- Flammable chemicals: Organic solvents.

# **A** CAUTION

### **INOPERATIVE EQUIPMENT**

Do not allow water, liquids, metal, and wiring fragments to enter the panel case.

Failure to follow these instructions can result in injury or equipment damage.

### **Structural Specifications**

	HMIGTO2300/HMIGTO2310	HMIGTO2315	
Grounding	Functional grounding: Grounding resistance of $100\Omega$ , $2\text{mm}^2$ (AWG 14) or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)		
Cooling Method	Natural air circulation		
Structure*1	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)	IP66k NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)*2	
External Dimensions	W169.5 x H137 x D59.5 mm (W6.67 x H5.39 x D2.34 in.)	W213.5 x H181 x D59.5 mm (W8.41 x H7.13 x D2.34 in.)	
Panel Cut Dimensions	W156 x H123.5 mm (W6.14 x H4.86 in.) *3 Panel thickness area: 1.65 mm (0.060.2 in.) *4	W195 x H162.5 mm (W7.68 x H6.40 in.) *3 Panel thickness area: 1.65 mm (0.060.2 in.) *4	
Weight	0.8 kg (1.8 lbs) or less (main unit only)	1.2 kg (2.6 lbs) or less (main unit only)	

**NOTE:** \*1 The front face of the HMIGTO, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification. Even though the HMIGTO's level of resistance is equivalent to these standards, oils that should have no effect on the HMIGTO can possibly harm the panel. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the panel for long periods of time. If the panel's front face protection sheet peels off, these conditions can lead to the ingress of oil into the panel and separate protection measures are suggested.

Also, if non-approved oils are present, they may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the panel, be sure to confirm the type of conditions that will be present in the panel's operating environment. If the installation gasket is used for a long period of time, or if the panel and its gasket are removed from the panel, the original level of protection cannot be kept. To maintain the original protection level, be sure to replace the installation gasket regularly.

\*2 When installing the HMIGTO in a panel, you may not be able to mount the HMIGTO flush with the panel. This occurs due to the thickness of the gasket. The difference in level between the HMIGTO and panel depends on how much the gasket is compressed.

# NOTICE

#### **EQUIPMENT DAMAGE**

For food and beverage and pharmaceutical industries, when the HMIGTO is not flush with panel, use silicon to form a seal to prevent water, chemicals, or food from lodging into place. Otherwise, the panel face could leak.

Failure to follow these instructions can result in equipment damage.

# **A** CAUTION

#### **EQUIPMENT DAMAGE**

Ensure that the panel is not in permanent and direct contact with oils.

Failure to follow these instructions can result in injury or equipment damage.

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<sup>\*3</sup> For dimensional tolerance, everything +1/-0 mm (+0.04/-0 in.) and R in angle are below R3 (R0.12 in.)

<sup>\*4</sup> Even if the installation wall thickness is within the recommended range for the "Panel Cut Dimensions", depending on wall's material, size, and installation location of the panel and other devices, the installation wall could warp. To prevent warping, the installation surface may need to be strengthened.

# NOTICE

# STORAGE AND OPERATION OUTSIDE OF SPECIFICATIONS

- Store the panel in areas where temperatures are within the panel's specifications.
- Do not restrict or block the panel's rear-face ventilation slots.

Failure to follow these instructions can result in equipment damage.

# **NOTICE**

#### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

# **Display Specifications**

Display Type		TFT Color LCD
Display Size		5.7"
Resolution (pixels	;)	320 x 240 pixels (QVGA)
Effective Display	Area	W115.2 x H86.4 mm (W4.54 x H3.40 in.)
Display Colors		65,536 colors (No blink) / 16,384 colors (Blink)
Backlight		White LED (Not user replaceable. When replacement is required, contact your local distributor.)
Backlight Service	Life	50,000 hours or more (continuous operation at 25 $^{\circ}$ C [77 $^{\circ}$ F] before backlight decreases to 50%.)
Brightness Control		16 levels (Adjusted with touch panel or software)
Language Fonts		ASCII: (Code page 850) Alphanumeric (including European characters) Chinese: (GB2312-80 codes) Simplified Chinese fonts Japanese (except for XBT GT1000 series): ANK 158, Kanji: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) Korean: (KSC5601 - 1992 codes) Hangul fonts Taiwanese: (Big 5 codes) Traditional Chinese fonts
Character Sizes		8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts
Font Sizes		You can expand the width up to 8 times, and expand the height up to 8 times.*1
Text	8 x 8 pixels	40 characters per row x 30 rows
	8 x 16 pixels	40 characters per row x 15 rows
	16 x 16 pixels	20 characters per row x 15 rows
	32 x 32 pixels	10 characters per row x 7 rows

<sup>\*1</sup> You can set up other font sizes using the software.

# Memory, Clock, and Touch Panel

#### **Memory**

	HMIGTO2310 / HMIGTO2315	HMIGTO2300
Application Memory *1	FLASH EPROM 96 MB	FLASH EPROM 64 MB
Application run DRAM	128 MB	128 MB
Data Backup	SRAM 512 KB (Replaceable lithium battery for data backup)	SRAM 128 KB (Rechargeable lithium battery for data backup)

<sup>\*1</sup> Capacity available for user application.

#### NOTE:

- When the message "Battery level is low" is displayed on the HMIGTO2300, supply power to the panel
  and fully charge the battery. In 24 hours the battery charges to a level that allows backup operation.
  Completing a full charge requires about 120 hours (5 days).
- The lithium battery's lifetime is: 10 years when the battery's ambient temperature is 40 °C (104 °F) or less, 4.1 years when the battery's ambient temperature is 50 °C (122 °F) or less, and 1.5 years when the battery's ambient temperature is 60 °C (140 °F) or less.
   When used for backup:

Approximately 100 days, with a fully charged battery.

Approximately 6 days, with a half-charged battery.

#### Clock

Clock Accuracy*1	±65 seconds/month (deviation at room temperature and power is OFF).

<sup>\*1</sup> Depending on the operating temperature and age of panel, the clock can deviate from -380 to +90 sec/month. For systems where this level of precision is insufficient, the user should monitor and make adjustments when required.

#### NOTE:

- When the message "Battery level is low" is displayed on the HMIGTO2300, supply power to the panel
  and fully charge the battery. In 24 hours the battery charges to a level that allows backup operation.
   Completing a full charge requires about 120 hours (5 days).
- The lithium battery's lifetime is: 10 years when the battery's ambient temperature is 40 °C (104 °F) or less, 4.1 years when the battery's ambient temperature is 50 °C (122 °F) or less, and 1.5 years when the battery's ambient temperature is 60 °C (140 °F) or less.

When used for backup:

Approximately 100 days, with a fully charged battery.

Approximately 6 days, with a half-charged battery.

#### **Touch Panel**

Touch Panel Type	Resistive Film (analog)		
Touch Panel Resolution	1,024 x 1,024		
Touch Panel Service Life	1 million times or more		

# **Interface Specifications**

### **Serial Interface COM1**

Asynchronous Transmission	RS-232C
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps
Connector	D-Sub 9 pin (plug)

#### **Serial Interface COM2**

Asynchronous Transmission	RS-485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI)
Connector	Modular jack (RJ-45)

### **USB** Interface

	USB (Type A) Interface	USB (mini-B) Interface
Connector	USB 2.0 (Type A) x 1	USB 2.0 (mini-B) x 1
Power Supply Voltage	5 Vdc ±5%	-
Maximum Current Supplied	500 mA	-
Maximum Transmission 5 m (16.4 ft) Distance		

### **Ethernet Interface**

	HMIGTO2310 / HMIGTO2315
Ethernet (LAN)	IEEE802.3i / IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ45) x 1

### **SD Card Interface**

HMIGTO2310/HMIGTO2315: SD Card slot x 1 (maximum 32 GB SD/SDHC Card)

**NOTE:** HMIGTO2300 does not have an SD Card interface.

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### **Specifications of Serial Interface COM1**

#### Introduction

# **A** CAUTION

#### **LOSS OF POWER**

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put
  excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# A A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM1**

HMIGTO2300 / HMIGTO2310/ HMIGTO2315: D-Sub 9 pin plug connector via an RS-232C cable.

Pin Connection Pin No.			Pin No.	RS-232C			
				Signal Name	Direction	Meaning	
		)	1	CD	Input	Carrier Detect	
_			2	RD(RXD)	Input	Receive Data	
5		9	3	SD(TXD)	Output	Send Data	
	000		4	ER(DTR)	Output	Data Terminal Ready	
1		6	5	SG	-	Signal Ground	
			6	DR(DSR)	Input	Data Set Ready	
(	(Maralia		7	RS(RTS)	Output	Request to Send	
(Magelis GTO side)		8	CS(CTS)	Input	Send possible		
		<i>ic)</i>	9	CI(RI)/VCC	Input/-	Called Status Display	
						+5V±5% Output 0.25A*1	
			Shell	FG	_	Frame Ground (Common with SG)	

NOTE: \*1 You can switch pin #9 between RI and VCC via software.

# **NOTICE**

# **EQUIPMENT DAMAGE**

Use only the rated current.

Failure to follow these instructions can result in equipment damage.

Interfit bracket is #4-40 (UNC).

# **A** CAUTION

### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
  Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9 pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

# **Specifications of Serial Interface COM2**

#### Introduction

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect
  the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM2**

HMIGTO2300 / HMIGTO2310/ HMIGTO2315: RJ45 connector via an RS-485 cable.

**NOTE:** When setting up RS-485 communication, the cable diagram for some equipment may require polarization on the terminal side. This terminal does not require any special setting as it handles polarization automatically.

Pin Connection	Pin No.	RS-422/RS-485		
		Signal Name	Direction	Meaning
1 8	1	NC	-	-
	2	NC	-	-
	3	NC	-	-
	4	Line A	Input/Output	Transfer Data (RS-485)
	5	Line B	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request To Send
	7	NC	-	-
	8	SG	-	Signal Ground

# **A** CAUTION

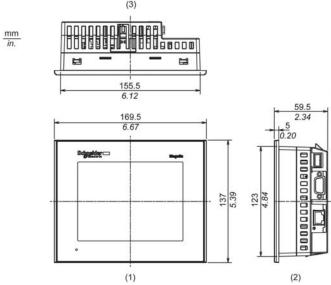
#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

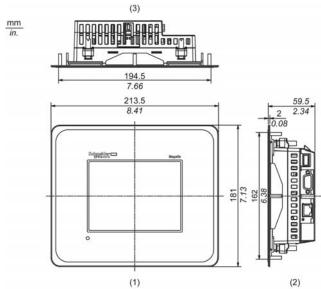
# **Dimensions**

# External Dimensions: HMIGTO2300/HMIGTO2310



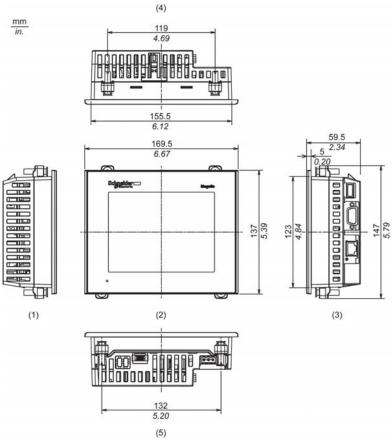
- Front
- 2 Right Side
- Top

#### **External Dimensions: HMIGTO2315**



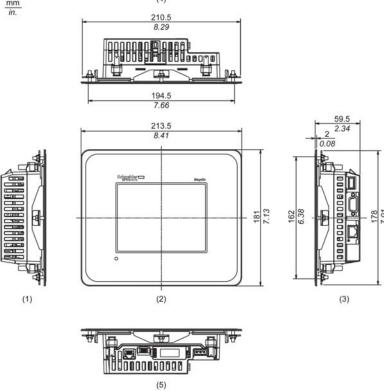
- Front
- 2 Right Side
- Top

## Installation with Installation Fasteners: HMIGTO2300/HMIGTO2310

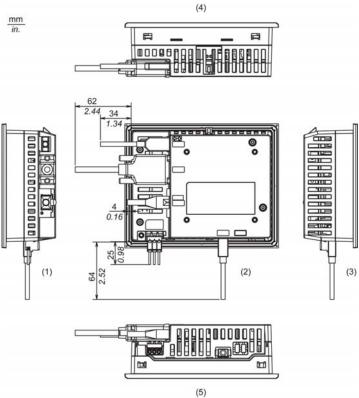


- Left Side
- Front
- 2 3 4 5 Right Side
- Top
- Bottom

## Installation with Installation Fasteners: HMIGTO2315



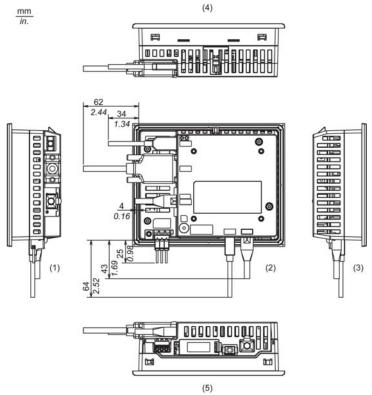
- Left Side
- 2 3 Front Right Side
- 4 Тор
- Bottom



- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

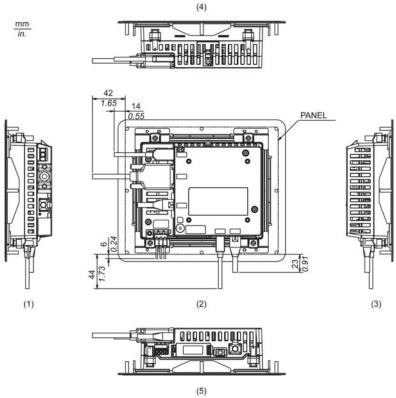
**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

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- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

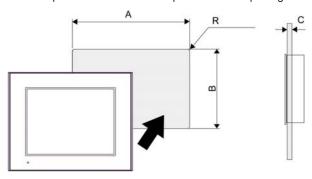


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

## **Panel Cut Dimensions**

Create a panel cut and insert the panel into the opening from the front.

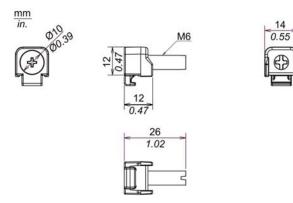


	A	В	С	R
HMIGTO2310 HMIGTO2300	156 mm (+1/-0) mm (6.14 in [+0.04, -0 in.])	123.5 mm (+1, -0 mm) (4.86 in [+0.04, -0 in.])	1.65 mm (0.060.2 in.)	3 mm (0.12 in.) maximum
HMIGTO2315	195 mm (+1/-0) mm (7.68 in [+0.04, -0in.])	162.5 mm (+1/-0) mm (6.40 in [+0.04, -0in.])		

NOTE: Before designing the panel cut, refer to Installation (see page 120).

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# **Installation Fastener Dimensions**



# Section 4.3 HMIGTO3510/4310

## What Is in This Section?

This section contains the following topics:

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Structural Specifications	71
Display Specifications	72
Memory, Clock, Touch Panel, and Function Switches	
Interface Specifications	74
Specifications of Serial Interface COM1	75
Specifications of Serial Interface COM2	77
Dimensions	78

# **Electrical Specifications**

	Rated Input Voltage		24 Vdc	
	Input Voltage Limits		19.228.8 Vdc	
	Voltage Drop		5 ms or less	
	Power Consumption		12 W or less	
ply		When power is not supplied to external devices	8 W or less	
Supply		Backlight OFF (Standby Mode)	5 W or less	
Power		Backlight Dimmed (Brightness: 20%)	5.5 W or less	
Po	In-Rush Current		30 A or less	
Voltage Endurance			1,000 Vac, 20 mA for 1 minute (between charging and FG terminals)	
Insulation Resistance			500 Vdc, 10 M $\Omega$ or more (between charging and FG terminals)	

# **Environmental Specifications**

		HMIGTO4310	HMIGTO3510	
	Surrounding Air Temperature	055 °C (32131 °F)	050 °C (32122 °F)	
	Storage Temperature	-2060 °C (-4140 °F)		
ent	Surrounding Air and Storage Humidity	1090% RH (Non condensing, wet bulb temperature 39 $^{\circ}\text{C}$ [102.2 $^{\circ}\text{F}]$ or less)		
onm	Dust	0.1 mg/m <sup>3</sup> (10 <sup>-7</sup> oz/ft <sup>3</sup> ) or less (non-conductive levels)		
invii	Pollution Degree	For use in Pollution Degree 2 environment		
<u>й</u> Ш	Corrosive Gases	Free of corrosive gases		
Humidity  Dust  O.1 mg/m³ (10 <sup>-7</sup> oz/ft³) or less (non Pollution Degree  For use in Pollution Degree 2 envire  Corrosive Gases  Free of corrosive gases  Atmospheric pressure (Operating Altitude)			ower)	
invironment	Vibration Resistance	IEC/EN 61131-2 59 Hz Single amplitude 3.5 mm (0.14 in.) 9150 Hz Fixed acceleration: 9.8 m/s <sup>2</sup> X, Y, Z directions for 10 cycles (approx. 100 min)		
Ö		IEC/EN 61131-2 compliant 147 m/s <sup>2</sup> , X, Y, Z directions for 3 times		
ronment	Noise Immunity	Noise Voltage: 1,000 Vp-p Pulse Width: 1 μs Rise Time: 1 ns		
Electrical Environment	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV (IEC/EN 61000-4-2 Level 3)		

# Air quality requirements

Do not operate or store the panel where chemicals evaporate, or where chemicals are present in the air:

- Corrosive chemicals: Acids, alkalines, liquids containing salt.
- Flammable chemicals: Organic solvents.

# **A** CAUTION

#### **INOPERATIVE EQUIPMENT**

Do not allow water, liquids, metal, and wiring fragments to enter the panel case.

Failure to follow these instructions can result in injury or equipment damage.

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## **Structural Specifications**

Grounding	Functional grounding: Grounding resistance of 100 $\Omega$ , 2 mm <sup>2</sup> (AWG 14) or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)
Cooling Method	Natural air circulation
Structure*1	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)
External Dimensions	W218 x H173 x D60 mm (W8.58 x H6.81 x D2.36 in.)
Panel Cut Dimensions	W204.5 x H159.5 mm (W8.05 x H6.28 in.)*2 Panel thickness area: 1.65 mm (0.060.2 in.)*3
Weight	1.2 kg (2.6 lb) or less (main unit only)

**NOTE:** \*1 The front face of the HMIGTO, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification. Even though the HMIGTO's level of resistance is equivalent to these standards, oils that should have no effect on the HMIGTO can possibly harm the panel. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the panel for long periods of time. If the panel's front face protection sheet peels off, these conditions can lead to the ingress of oil into the panel and separate protection measures are suggested.

Also, if non-approved oils are present, they may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the HMIGTO, be sure to confirm the type of conditions that will be present in the panel's operating environment. If the installation gasket is used for a long period of time, or if the HMIGTO and its gasket are removed from the panel, the original level of protection cannot be kept. To maintain the original protection level, be sure to replace the installation gasket regularly.

# **A** CAUTION

## **EQUIPMENT DAMAGE**

Ensure that the panel is not in permanent and direct contact with oils.

Failure to follow these instructions can result in injury or equipment damage.

# **NOTICE**

# STORAGE AND OPERATION OUTSIDE OF SPECIFICATIONS

- Store the panel in areas where temperatures are within the panel's specifications.
- Do not restrict or block the panel's rear-face ventilation slots.

Failure to follow these instructions can result in equipment damage.

## NOTICE

#### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

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<sup>\*2</sup> For dimensional tolerance, everything +1/-0 mm (+0.04/-0 in.) and R in angle are below R3 (R0.12 in.)

<sup>\*3</sup> Even if the installation wall thickness is within the recommended range for the "Panel Cut Dimensions", depending on wall's material, size, and installation location of the panel and other devices, the installation wall could warp. To prevent warping, the installation surface may need to be strengthened.

# **Display Specifications**

		HMIGTO4310	HMIGTO3510	
Display Type		TFT Color LCD		
Display Size		7.5"	7.0"	
Resolution		640 x 480 pixels (VGA)	800 x 480 pixels (WVGA)	
Effective Display	Area	W153.7 x H115.8 mm (W6.05 x H4.56 in.)	W152.4 x H91.44 mm (W6.0 x H3.6 in.)	
Display Colors		65,536 colors (No blink) / 16,384	colors Blink)	
Backlight		White LED (Not user replaceable. When replacement is required, contact your local distributor.)		
Backlight Service Life		50,000 hours or more (continuous operation at 25 °C [77 °F] before backlight brightness decreases to 50%)		
Brightness Control		16 levels (Adjusted with touch panel or software)		
Language Fonts		ASCII: (Code page 850) Alphanumeric (including European characters) Chinese: (GB2312-80 codes) Simplified Chinese fonts Japanese (except for XBT GT1000 series): ANK 158, Kanji: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) Korean: (KSC5601 - 1992 codes) Hangul fonts Taiwanese: (Big 5 codes) Traditional Chinese fonts		
Character sizes		8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts		
Font sizes		You can expand the width up to 8 times, and expand the height up to 8 times.*1		
Text	8 x 8 pixels	80 characters per row x 60 rows	100 characters per row x 60 rows	
	8 x 16 pixels	80 characters per row x 30 rows	100 characters per row x 30 rows	
	16 x 16 pixels	40 characters per row x 30 rows	50 characters per row x 30 rows	
	32 x 32 pixels	20 characters per row x 15 rows	25 characters per row x 15 rows	

<sup>\*1</sup> You can set up other font sizes using the software.

# Memory, Clock, Touch Panel, and Function Switches

## Memory

	HMIGTO4310	HMIGTO3510	
Application Memory *1	FLASH EPROM 96 MB	FLASH EPROM 96 MB	
Application run DRAM	128 MB	128 MB	
Data Backup SRAM 512 KB (Replaceable lithium battery for data backup)		SRAM 128 KB (Replaceable lithium battery for data backup)	

<sup>\*1</sup> Capacity available for user application.

## NOTE:

 When the message "Battery level is low" is displayed, supply power to the panel and fully charge the battery.

#### Clock

Clock Accuracy*1	±65 seconds/month (deviation at room temperature and power is OFF).

<sup>\*1</sup> Depending on the operating temperature and age of panel, the clock can deviate from -380 to +90 sec/month. For systems where this level of precision is insufficient, the user should monitor and make adjustments when required.

#### **Touch Panel**

Touch Panel Type	Resistive Film (analog)
Touch Panel Resolution	1,024 x 1,024
Touch Panel Service Life	1 million times or more

#### **Function Switches**

HMIGTO3510: Eight switches (F1 to F8).

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# **Interface Specifications**

# **Serial Interface COM1**

Asynchronous Transmission	RS-232C
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps
Connector	D-Sub 9 pin (plug)

# **Serial Interface COM2**

Asynchronous Transmission	RS-485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI)
Connector	Modular jack (RJ-45)

## **USB** Interface

	USB (Type A) Interface	USB (mini-B) Interface
Connector	USB 2.0 (Type A) x 1	USB 2.0 (mini-B) x 1
Power Supply Voltage	5 Vdc ±5%	-
Maximum Current Supplied	500 mA	-
Maximum Transmission Distance	5 m (16.4 ft)	

### **Ethernet Interface**

Ethernet (LAN)	IEEE802.3i / IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ45) x 1

# **SD Card Interface**

SD Card slot x 1 (maximum 32 GB SD/SDHC Card)

## **Specifications of Serial Interface COM1**

#### Introduction

# **A** CAUTION

#### LOSS OF POWER

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put
  excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **AA** DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect
  the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM1**

HMIGTO3510 / HMIGTO4310: D-Sub 9 pin plug connector via an RS-232C cable.

Pin Connection Pin No.		RS-232C				
			Signal Name	Direction	Meaning	
			1	CD	Input	Carrier Detect
			2	RD(RXD)	Input	Receive Data
5		9	3	SD(TXD)	Output	Send Data
			4	ER(DTR)	Output	Data Terminal Ready
4		6	5	SG	-	Signal Ground
1		O	6	DR(DSR)	Input	Data Set Ready
			7	RS(RTS)	Output	Request to Send
(Magelis GTO side)		8	CS(CTS)	Input	Send possible	
		9	CI(RI)/VCC	Input/-	Called Status Display	
					+5V±5% Output 0.25A*1	
			Shell	FG	_	Frame Ground (Common with SG)

NOTE: \*1 You can switch pin #9 between RI and VCC via software.

# NOTICE

#### **EQUIPMENT DAMAGE**

Use only the rated current.

Failure to follow these instructions can result in equipment damage.

Interfit bracket is #4-40 (UNC).

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# **A** CAUTION

## LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
  Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9 pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

## **Specifications of Serial Interface COM2**

#### Introduction

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM2**

HMIGTO3510 / HMIGTO4310: RJ45 connector via a RS-485 cable.

NOTE: When setting up RS-485 communication, the cable diagram for some equipment may require polarization on the terminal side. This terminal does not require any special setting as it handles polarization automatically.

Pin Connection	Pin No.	RS-485		
		Signal Name	Direction	Meaning
1 8	1	NC	-	-
	2	NC	-	-
	3	NC	-	-
	4	Line A	Input/Output	Transfer Data (RS-485)
	5	Line B	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request To Send
	7	NC	-	-
	8	SG	-	Signal Ground

# **A** CAUTION

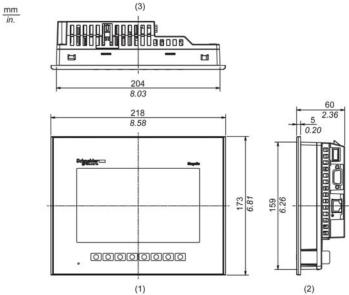
#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

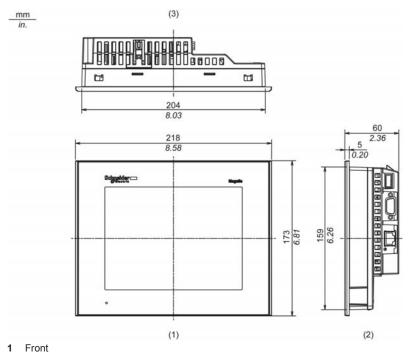
# **Dimensions**

# **External Dimensions: HMIGTO3510**



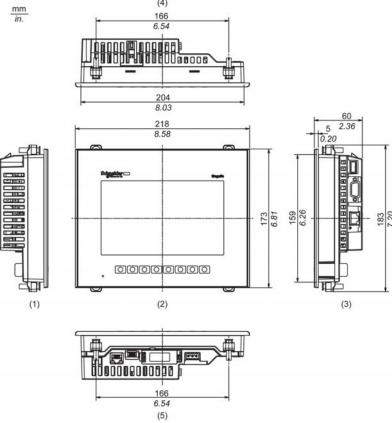
- 1 Front
- 2 3 Right Side
- Top

# **External Dimensions: HMIGTO4310**



- 2 Right Side
- Top

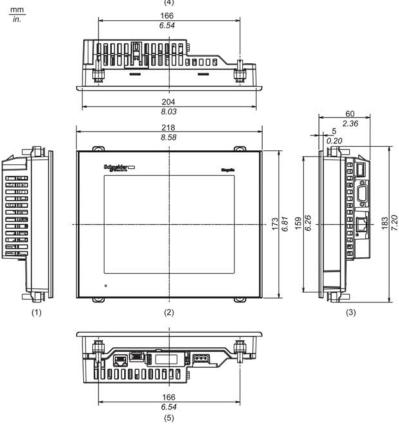
## Installation with Installation Fasteners: HMIGTO3510



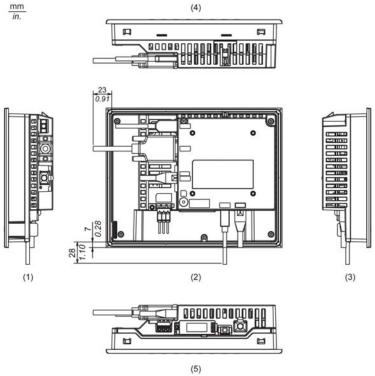
- Left Side
- Front
- 2 Right Side
- 4 5 Top
- Bottom

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## Installation with Installation Fasteners: HMIGTO4310

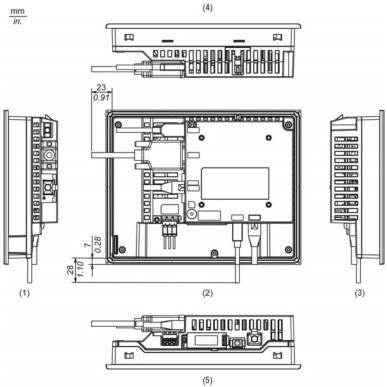


- 1 Left Side
- Front
- 2 3 Right Side
- Top
- 4 5 Bottom



- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

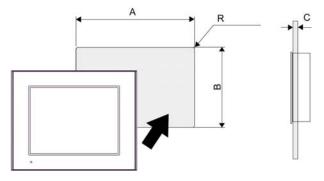


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

#### **Panel Cut Dimensions**

Create a panel cut and insert the panel into the opening from the front.

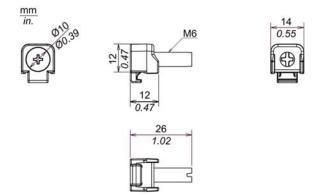


Α	В	С	R
204.5 mm (+1, -0 mm)	159.5 mm (+1, -0 mm)	1.65 mm	3 mm (0.12 in.)
(8.05 in. [+0.04, -0 in.])	(6.28 in. [+0.04, -0 in.])	(0.060.2 in.)	maximum

NOTE: Before designing the panel cut, refer to Installation (see page 120).

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# **Installation Fastener Dimensions**



# **Section 4.4** HMIGTO5310/5315

## What Is in This Section?

This section contains the following topics:

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Display Specifications	89
Memory, Clock, and Touch Panel	90
Interface Specifications	91
Specifications of Serial Interface COM1	92
Specifications of Serial Interface COM2	94
Dimensions	95

# **Electrical Specifications**

	Rated In	out Voltage	24 Vdc
	Input Voltage Limits 1		19.228.8 Vdc
	Voltage Drop		10 ms or less
	Power Co	onsumption	17 W or less
	When power is not supplied to external devices		12 W or less
Supply		Backlight OFF (Standby Mode)	7 W or less
Power Sul		Backlight Dimmed (Brightness: 20%)	8 W or less
Pov	In-Rush Current		30 A or less
Vo	Voltage Endurance		1500 Vac, 20 mA for 1 min. (between charging and FG terminals)
Insulation Resistance		esistance	500 Vdc, 10 M $\Omega$ or more (between charging and FG terminals)

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# **Environmental Specifications**

	Surrounding Air Temperature	055 °C (32131 °F)
	Storage Temperature	-2060 °C (-4140 °F)
ent	Surrounding Air and Storage Humidity	1090% RH (Non condensing, wet bulb temperature 39 °C [102.2 °F] or less)
muo	Dust	0.1 mg/m <sup>3</sup> (10 <sup>-7</sup> oz/ft <sup>3</sup> ) or less (non-conductive levels)
invir	Pollution Degree	For use in Pollution Degree 2 environment
la E	Corrosive Gases	Free of corrosive gases
Physical Environment	Atmospheric Pressure (Operating Altitude)	8001,114 hPa (2,000 m [6,561 ft] or lower)
nvironment	Vibration Resistance	IEC/EN 61131-2 compliant 59 Hz Single amplitude 3.5 mm (0.14 in.) 9150 Hz Fixed acceleration: 9.8 m/s <sup>2</sup> X, Y, Z directions for 10 cycles (approx. 100 min.)
Mechanical Environment	Concussion Resistance	IEC/EN 61131-2 compliant 147 m/s <sup>2</sup> , X, Y, Z directions for 3 times
ronment	Noise Immunity	Noise Voltage: 1,000 Vp-p Pulse Width: 1 μs Rise Time: 1 ns
Electrical Environment	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV (IEC/EN 61000-4-2 Level 3)

# Air quality requirements

Do not operate or store the panel where chemicals evaporate, or where chemicals are present in the air:

- Corrosive chemicals: Acids, alkalines, liquids containing salt.
- Flammable chemicals: Organic solvents.

# **A** CAUTION

## **INOPERATIVE EQUIPMENT**

Do not allow water, liquids, metal, and wiring fragments to enter the panel case.

Failure to follow these instructions can result in injury or equipment damage.

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## **Structural Specifications**

	HMIGTO5310	HMIGTO5315	
Grounding	Functional grounding: Grounding resistance of $100\Omega$ , $2\text{mm}^2$ (AWG 14) or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)		
Cooling Method	Natural air circulation		
Structure*1	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)	IP66k NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)*2	
External Dimensions	W272.5 x H214.5 x D57 mm (W10.73 x H8.44 x D2.24 in.)	W316.5 x H258.5 x D57 mm (W12.44 x H10.18 x D2.24 in.)	
Panel Cut Dimensions	W259 x H201 mm (W10.2 x H7.91 in.)*3 Panel thickness area: 1.65 mm (0.060.2 in.)*4	W298 x H240 mm (W11.73 x H9.45 in.)*3 Panel thickness area: 1.65 mm (0.060.2 in.)*4	
Weight	2.0 kg (4.4 lb) or less (main unit only)	2.5 kg (5.5 lb) or less (main unit only)	

**NOTE:** \*1 The front face of the HMIGTO, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification. Even though the HMIGTO's level of resistance is equivalent to these standards, oils that should have no effect on the HMIGTO can possibly harm the panel. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the panel for long periods of time. If the panel's front face protection sheet peels off, these conditions can lead to the ingress of oil into the panel and separate protection measures are suggested.

Also, if non-approved oils are present, they may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the HMIGTO, be sure to confirm the type of conditions that will be present in the panel' operating environment. If the installation gasket is used for a long period of time, or if the HMIGTO and its gasket are removed from the panel, the original level of protection cannot be kept. To maintain the original protection level, be sure to replace the installation gasket regularly.

\*2 When installing the HMIGTO in a panel, you may not be able to mount the HMIGTO flush with the panel. This occurs due to the thickness of the gasket. The difference in level between the HMIGTO and panel depends on how much the gasket is compressed.

# NOTICE

#### **EQUIPMENT DAMAGE**

For food and beverage and pharmaceutical industries, when the HMIGTO is not flush with panel, use silicon to form a seal to prevent water, chemicals, or food from lodging into place. Otherwise, the panel face could leak.

Failure to follow these instructions can result in equipment damage.

# **A** CAUTION

#### **EQUIPMENT DAMAGE**

Ensure that the panel is not in permanent and direct contact with oils.

Failure to follow these instructions can result in injury or equipment damage.

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<sup>\*3</sup> For dimensional tolerance, everything +1/-0 mm (+0.04/-0 in.) and R in angle are below R3 (R0.12 in.)

<sup>\*4</sup> Even if the installation wall thickness is within the recommended range for the "Panel Cut Dimensions", depending on wall's material, size, and installation location of the panel and other devices, the installation wall could warp. To prevent warping, the installation surface may need to be strengthened.

# NOTICE

# STORAGE AND OPERATION OUTSIDE OF SPECIFICATIONS

- Store the panel in areas where temperatures are within the panel's specifications.
- Do not restrict or block the panel's rear-face ventilation slots.

Failure to follow these instructions can result in equipment damage.

# **NOTICE**

#### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

# **Display Specifications**

Display Type		TFT Color LCD	
Display Size		10.4"	
Resolution		640 x 480 pixels (VGA)	
Effective Display	y Area	W211.2 x H158.4 mm (8.31 x 6.24 in.)	
Display Colors		65,536 colors (No blink) / 16,384 colors (Blink)	
Backlight		White LED (Not user replaceable. When replacement is required, contract your local distributor.)	
Backlight Service	e Life	50,000 hours or more (continuous operation at 25 $^{\circ}$ C [77 $^{\circ}$ F] before backlight brightness dimmed to 50%	
Brightness Control		16 levels (Adjusted with the touch panel or software)	
Language Fonts		ASCII: (Code page 850) Alphanumeric (including European characters) Chinese: (GB2312-80 codes) Simplified Chinese fonts Japanese: ANK 158, Kanji: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) Korean: (KSC5601 - 1992 codes) Hangul fonts Taiwanese: (Big 5 codes) Traditional Chinese fonts	
Character Sizes	i	8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts	
Font Sizes		You can expand the width up to 8 times, and expand the height up to 8 times.*1	
Text 8 x 8 pixels		80 characters per row x 60 rows	
	8 x 16 pixels	80 characters per row x 30 rows	
	16 x 16 pixels	40 characters per row x 30 rows	
	32 x 32 pixels	20 characters per row x 15 rows	

<sup>\*1</sup> You can set up other font sizes using the software.

# Memory, Clock, and Touch Panel

## Memory

Application Memory *1	FLASH EPROM 96 MB
Application run DRAM	128 MB
Data Backup	SRAM 512 KB (Replaceable lithium battery for data backup)

<sup>\*1</sup> Capacity available for user application.

#### NOTE:

• When the message "Battery level is low" is displayed, supply power to the panel and fully charge the battery.

## Clock

Clock Accuracy*1	±65 seconds/month (deviation at room temperature and power is OFF).
------------------	---

<sup>\*1</sup> Depending on the operating temperature and age of panel, the clock can deviate from -380 to +90 sec/month. For systems where this level of precision is insufficient, the user should monitor and make adjustments when required.

#### **Touch Panel**

Touch Panel Type	Resistive Film (analog)
Touch Panel Resolution	1,024 x 1,024
Service Life	1 million times or more

# **Interface Specifications**

# **Serial Interface COM1**

Asynchronous Transmission	RS-232C
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps
Connector	D-Sub 9 pin (plug)

# **Serial Interface COM2**

Asynchronous Transmission	RS-485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI)
Connector	Modular jack (RJ-45)

# **USB** Interface

	USB (Type A) Interface	USB (mini-B) Interface
Connector	USB 2.0 (Type A) x 1	USB 2.0 (mini-B) x 1
Power Supply Voltage	5 Vdc ±5%	-
Maximum Current Supplied	500 mA	-
Maximum Transmission Distance	5 m (16.4 ft)	

#### **Ethernet Interface**

Ethernet (LAN)	IEEE802.3i / IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ45) x 1

# **SD Card Interface**

SD Card slot x 1 (maximum 32 GB SD/SDHC Card)

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## **Specifications of Serial Interface COM1**

#### Introduction

# **A** CAUTION

#### **LOSS OF POWER**

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put
  excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM1**

HMIGTO5310 / HMIGTO5315: D-Sub 9 pin plug connector via an RS-232C cable.

Pin Connection Pin No.		Pin No.	RS-232C			
			Signal Name	Direction	Meaning	
		1	CD	Input	Carrier Detect	
5 9 6 (Magelis GTO side)	2	RD(RXD)	Input	Receive Data		
	3	SD(TXD)	Output	Send Data		
	4	ER(DTR)	Output	Data Terminal Ready		
	5	SG	-	Signal Ground		
	6	DR(DSR)	Input	Data Set Ready		
	7	RS(RTS)	Output	Request to Send		
	8	CS(CTS)	Input	Send possible		
O 1 O side)		9	CI(RI)/VCC	Input/–	Called Status Display	
					+5V±5% Output 0.25A*1	
		Shell	FG	_	Frame Ground (Common with SG)	

**NOTE:** \*1 You can switch pin #9 between RI and VCC via software.

# **NOTICE**

# **EQUIPMENT DAMAGE**

Use only the rated current.

Failure to follow these instructions can result in equipment damage.

Interfit bracket is #4-40 (UNC).

# **A** CAUTION

## LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
  Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9 pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

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## **Specifications of Serial Interface COM2**

#### Introduction

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

#### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect
  the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM2**

HMIGTO5310 / HMIGTO5315: RJ45 connector via a RS-485 cable.

**NOTE:** When setting up RS-485 communication, the cable diagram for some equipment may require polarization on the terminal side. This terminal does not require any special setting as it handles polarization automatically.

Pin Connection	Pin No.	RS-485		
		Signal Name	Direction	Meaning
1 8	1	NC	-	-
	2	NC	-	-
	3	NC	-	-
	4	Line A	Input/Output	Transfer Data (RS-485)
	5	Line B	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request To Send
	7	NC	-	-
	8	SG	-	Signal Ground

# **A** CAUTION

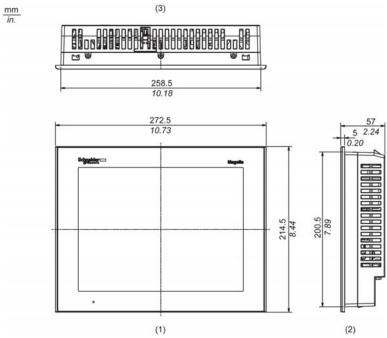
#### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- · Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

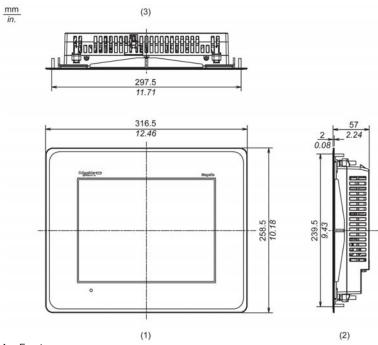
# **Dimensions**

# **External Dimensions: HMIGTO5310**



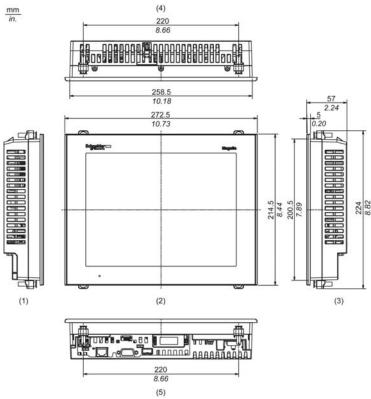
- Front
- Fron
   Right
   Top Right Side

# **External Dimensions: HMIGTO5315**



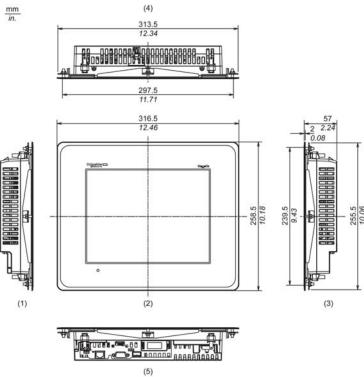
- Front
- 1 2 3 Right Side Top

# Installation with Installation Fasteners: HMIGTO5310



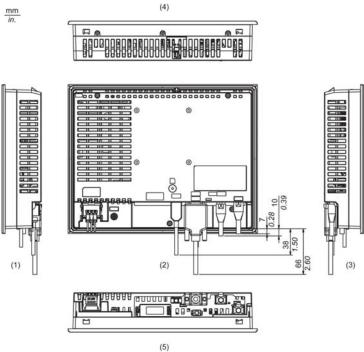
- Left Side
- 2 Front
- Right Side Top Bottom 3 4 5

### **Installation with Installation Fasteners: HMIGTO5315**



- Left Side Front Right Side 1 2 3
- 4 5 Top Bottom

### **Dimensions with Cables: HMIGTO5310**

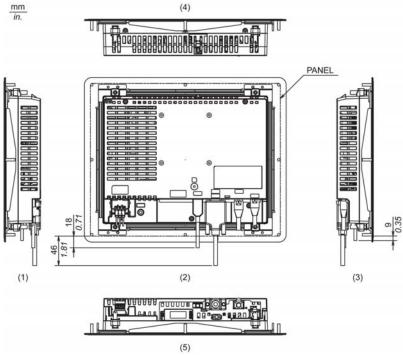


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

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### **Dimensions with Cables: HMIGTO5315**

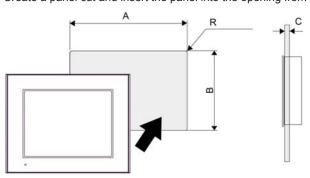


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

# **Panel Cut Dimensions**

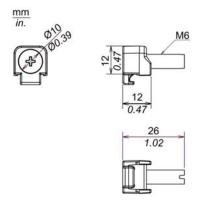
Create a panel cut and insert the panel into the opening from the front.



	A	В	С	R
HMIGTO5310	259 mm (+1, -0 mm) (10.2 in. [+0.04, -0 in.])	201 mm (+1, -0 mm) (7.91 in. [+0.04, -0 in.])		3 mm (0.12 in.) maximum
HMIGTO5315	298 mm (+1, -0 mm) (11.73 in. [+0.04, -0 in.])	240 mm (+1, -0 mm) (9.45 in. [+0.04, -0 in.])		

NOTE: Before designing the panel cut, refer to Installation (see page 120).

# **Installation Fastener Dimensions**





# **Section 4.5** HMIGTO6310/6315

### What Is in This Section?

This section contains the following topics:

Торіс	
Electrical Specifications	
Environmental Specifications	103
Structural Specifications	104
Display Specifications	
Memory, Clock, and Touch Panel	
Interface Specifications	
Specifications of Serial Interface COM1	
Specifications of Serial Interface COM2	
Dimensions	112

# **Electrical Specifications**

	Rated Input Voltage		24 Vdc	
Input Voltage Limits		age Limits	19.228.8 Vdc	
Voltage Drop		)rop	10 ms or less	
	Power Consumption		17 W or less	
		When power is not supplied to external devices	12 W or less	
pply	Backlight OFF (Standby Mode)  Backlight Dimmed (Brightness: 20%)		7 W or less	
Power Su			8 W or less	
In-Rush Current		Current	30 A or less	
Voltage Endurance		ırance	1,500 Vac, 20 mA for 1 minute (between charging and FG terminals)	
Insulation Resistance		sistance	500 Vdc, 10 MΩor more (between charging and FG terminals)	

# **Environmental Specifications**

	Surrounding Air Temperature	055 °C (32131 °F)
	Storage Temperature	-2060 °C (-4140 °F)
ent	Surrounding Air and Storage Humidity	1090% RH (Non condensing, wet bulb temperature 39 °C [102.2 °F] or less)
muo.	Dust	0.1 mg/m <sup>3</sup> (10 <sup>-7</sup> oz/ft <sup>3</sup> ) or less (non-conductive levels)
invir	Pollution Degree	For use in Pollution Degree 2 environment
le Sal	Corrosive gases	Free of corrosive gases
Physical Environment	Atmospheric Pressure (Operating Altitude)	8001,114 hPa (2,000 m [6,561 ft] or lower)
onment	Vibration Resistance	IEC/EN 61131-2 compliant 59 Hz Single amplitude 3.5 mm (0.14 in.) 9150 Hz Fixed acceleration: 9.8 m/s <sup>2</sup>
Enviro		X, Y, Z directions for 10 cycles (approx.100 minute)
Mechanical Environment	Concussion Resistance	IEC/EN 61131-2 compliant 147 m/s <sup>2</sup> , X, Y, Z directions for 3 times
ronment	Noise immunity	Noise Voltage: 1,000 Vp-p Pulse Width: 1 μs Rise Time: 1 ns
Electrical Environment	Electrostatic Discharge Immunity	Contact Discharge Method: 6 kV (IEC/EN 61000-4-2 Level 3)

### Air quality requirements

Do not operate or store the panel where chemicals evaporate, or where chemicals are present in the air:

- Corrosive chemicals: Acids, alkalines, liquids containing salt.
- Flammable chemicals: Organic solvents.

# **A** CAUTION

# **INOPERATIVE EQUIPMENT**

Do not allow water, liquids, metal, and wiring fragments to enter the panel case.

Failure to follow these instructions can result in injury or equipment damage.

# **Structural Specifications**

	HMIGTO6310	HMIGTO6315	
Grounding	Functional grounding: Grounding resistance of 100 $\Omega$ 2 mm <sup>2</sup> (AWG 14) or thicker wire, or your country's applicable standard. (Same for FG and SG terminals)		
Cooling Method	Natural air circulation		
Structure*1	IP65f NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure)	IP66k NEMA #250 TYPE 4X/13 (on the front panel when properly installed in an enclosure) <sup>*2</sup>	
External Dimensions	W315 x H241 x D56 mm (W12.4 x H9.49 x D2.2 in.)	W359 x H285 x D56 mm (W14.13 x H11.22 x D2.2 in.)	
Panel Cut Dimensions	W301.5 x H227.5 mm (W11.87 x H8.96 in.)*3 Panel thickness area: 1.65 mm (0.060.2 in.)*4	W340.5 x H266.5 mm (W13.41 x H10.49 in.)*3 Panel thickness area: 1.65 mm (0.060.2 in.)*4	
Weight	2.5 kg (5.5 lb) or less (main unit only)	3 kg (6.6 lb) or less (main unit only)	

**NOTE:** \*1 The front face of the HMIGTO, installed in a solid panel, has been tested using conditions equivalent to the standards shown in the specification. Even though the HMIGTO's level of resistance is equivalent to these standards, oils that should have no effect on the HMIGTO can possibly harm the panel. This can occur in areas where either vaporized oils are present, or where low viscosity cutting oils are allowed to adhere to the panel for long periods of time. If the panel's front face protection sheet peels off, these conditions can lead to the ingress of oil into the panel and separate protection measures are suggested.

Also, if non-approved oils are present, they may cause deformation or corrosion of the front panel's plastic cover. Therefore, prior to installing the HMIGTO, be sure to confirm the type of conditions that will be present in the panel's operating environment. If the installation gasket is used for a long period of time, or if the HMIGTO and its gasket are removed from the panel, the original level of protection cannot be kept. To maintain the original protection level, be sure to replace the installation gasket regularly.

\*2 When installing the HMIGTO in a panel, you may not be able to mount the HMIGTO flush with the panel. This occurs due to the thickness of the gasket. The difference in level between the HMIGTO and panel depends on how much the gasket is compressed.

# **NOTICE**

#### **EQUIPMENT DAMAGE**

For food and beverage and pharmaceutical industries, when the HMIGTO is not flush with panel, use silicon to form a seal to prevent water, chemicals, or food from lodging into place. Otherwise, the panel face could leak.

Failure to follow these instructions can result in equipment damage.

# **A** CAUTION

### **EQUIPMENT DAMAGE**

Ensure that the panel is not in permanent and direct contact with oils.

Failure to follow these instructions can result in injury or equipment damage.

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<sup>&</sup>lt;sup>\*3</sup> For dimensional tolerance, everything +1/-0 mm (+0.04/-0 in.) and R in angle are below R3 (R0.12in.)

<sup>\*4</sup> Even if the installation wall thickness is within the recommended range for the "Panel Cut Dimensions", depending on wall's material, size, and installation location of the panel and other devices, the installation wall could warp. To prevent warping, the installation surface may need to be strengthened.

# NOTICE

# STORAGE AND OPERATION OUTSIDE OF SPECIFICATIONS

- Store the panel in areas where temperatures are within the panel's specifications.
- Do not restrict or block the panel's rear-face ventilation slots.

Failure to follow these instructions can result in equipment damage.

# **NOTICE**

### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

# **Display Specifications**

Display Type		TFT Color LCD	
Display Size		12.1"	
Resolution		800 x 600 pixels (SVGA)	
Effective Display	Area	W246.0 x H184.5 mm (W9.69 x H7.26 in.)	
Display Colors		65,536 colors (No blink) / 16,384 colors (Blink)	
Backlight		White LED (Not user replaceable. When replacement is required, contact your local distributor.)	
Backlight Service Life		50,000 hours (continuous operation at at 25 °C [77 °F] before backlight brightness decreases to 50%)	
Brightness Contro	ol	16 levels (Adjusted with touch panel or software)	
Language Fonts		ASCII: (Code page 850) Alphanumeric (including European characters) Chinese: (GB2312-80 codes) Simplified Chinese fonts Japanese: ANK 158, Kanji: 6,962 (JIS Standards 1 & 2) (including 607 non-kanji characters) Korean: (KSC5601 - 1992 codes) Hangul fonts Taiwanese: (Big 5 codes) Traditional Chinese fonts	
Character Sizes		8 x 8, 8 x 16, 16 x 16 and 32 x 32 pixel fonts	
Text 8 x 8 pixels		100 characters per row x 75 rows	
8 x 16 pixels 16 x 16 pixels 32 x 32 pixels		100 characters per row x 37 rows	
		50 characters per row x 37 rows	
		25 characters per row x 18 rows	

<sup>\*1</sup> You can set up other font sizes using the software.

# Memory, Clock, and Touch Panel

### Memory

Application Memory*1	FLASH EPROM96 MB
Application run DRAM	128 MB
Data Backup	SRAM 512 KB (Replaceable lithium battery for backup memory)

<sup>\*1</sup> Capacity available for user application.

### NOTE:

• When the message "Battery level is low" is displayed, supply power to the panel and fully charge the battery.

# Clock

Clock Accuracy*1	$\pm 65$ seconds/month (deviation at room temperature and power is OFF).
------------------	--

<sup>\*1</sup> Depending on the operating temperature and age of the panel, the clock can deviate from -380 to +90 sec/month. For systems where this level of precision is insufficient, the user should monitor and make adjustments when required.

### **Touch Panel**

Touch Panel Type	Resistive Film (analog)	
Touch Panel Resolution	1,024 x 1,024	
Touch Panel Service Life	1 million times or more	

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# **Interface Specifications**

# **Serial Interface COM1**

Asynchronous Transmission	RS-232C
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps
Connector	D-Sub 9 pin (plug)

# **Serial Interface COM2**

Asynchronous Transmission	RS-485
Data Length	7 or 8 bits
Stop Bit	1 or 2 bits
Parity	None, odd or even
Data Transmission Speed	2,400115,200 bps, 187,500 bps (MPI)
Connector	Modular jack (RJ-45)

### **USB** Interface

	USB (Type A) Interface	USB (mini-B) Interface
Connector	USB 2.0 (Type A) x 1	USB 2.0 (mini-B) x 1
Power Supply Voltage	5 Vdc ±5%	-
Maximum Current Supplied	500 mA	-
Maximum Transmission Distance	5 m (16.4 ft)	

### **Ethernet Interface**

Ethernet (LAN)	IEEE802.3i / IEEE802.3u, 10BASE-T/100BASE-TX
Connector	Modular jack (RJ45) x 1

# **SD Card Interface**

SD Card slot x 1 (maximum 32 GB SD/SDHC Card)

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### **Specifications of Serial Interface COM1**

#### Introduction

# **A** CAUTION

#### LOSS OF POWER

- Make sure all connections to the communication ports on the bottom and sides of the panel do not put
  excessive stress on the ports.
- Securely attach communication cables to the panel or cabinet.
- Use only D-Sub 9 pin cables with a locking system in good condition.

Failure to follow these instructions can result in injury or equipment damage.

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **AA** DANGER

### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #5 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect
  the #5 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM1**

HMIGTO6310 / HMIGTO6315: D-Sub 9 pin plug connector via an RS-232C cable.

Pin Connection		Pin No.	RS-232C			
				Signal Name	Direction	Meaning
		)	1	CD	Input	Carrier Detect
_			2	RD(RXD)	Input	Receive Data
5	00	9	3	SD(TXD)	Output	Send Data
			4	ER(DTR)	Output	Data Terminal Ready
1		6	5	SG	-	Signal Ground
			6	DR(DSR)	Input	Data Set Ready
	Mogali	)	7	RS(RTS)	Output	Request to Send
	(Magelis GTO side)		8	CS(CTS)	Input	Send possible
`	710 310	<i>ac)</i>	9	CI(RI)/VCC	Input/–	Called Status Display
						+5V±5% Output 0.25A*1
			Shell	FG	_	Frame Ground (Common with SG)

NOTE: \*1 You can switch pin #9 between RI and VCC via software.

# **NOTICE**

### **EQUIPMENT DAMAGE**

Use only the rated current.

Failure to follow these instructions can result in equipment damage.

Interfit bracket is #4-40 (UNC).

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# **A** CAUTION

# LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
  Securely attach communication cables to the panel wall or cabinet.
- Use only D-Sub 9 pin cables with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

### **Specifications of Serial Interface COM2**

#### Introduction

The serial port is not isolated. The SG (signal ground) and FG (frame ground) terminals are connected inside the panel.

# **A** A DANGER

### **ELECTRIC SHOCK**

When using the SG terminal to connect an external device to the panel:

- Verify that a short-circuit loop is not created when you set up the system.
- Connect the #8 SG terminal to remote equipment when the host (PLC) unit is not isolated. Connect the #8 SG terminal to a known reliable ground connection to reduce the risk of damaging the circuit.

Failure to follow these instructions will result in death or serious injury.

#### **Serial Interface COM2**

HMIGTO6310 / HMIGTO6315: RJ45 connector via a RS-485 cable.

NOTE: When setting up RS-485 communication, the cable diagram for some equipment may require polarization on the terminal side. This terminal does not require any special setting as it handles polarization automatically.

Pin Connection	Pin No.	RS-485		
		Signal Name	Direction	Meaning
1 8	1	NC	-	-
	2	NC	-	-
Santa San San Andrews	3	NC	-	-
	4	Line A	Input/Output	Transfer Data (RS-485)
	5	Line B	Input/Output	Transfer Data (RS-485)
	6	RS(RTS)	Output	Request To Send
	7	NC	-	-
	8	SG	-	Signal Ground

# **A** CAUTION

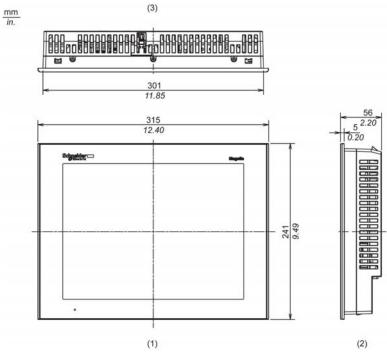
### LOSS OF COMMUNICATION

- All connections to the communication ports must not put excessive stress on the ports.
- Securely attach communication cables to the panel wall or cabinet.
- Use only RJ45 with a locking tab in good condition.

Failure to follow these instructions can result in injury or equipment damage.

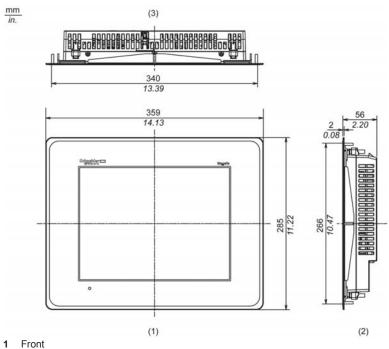
# **Dimensions**

# **External Dimensions: HMIGTO6310**



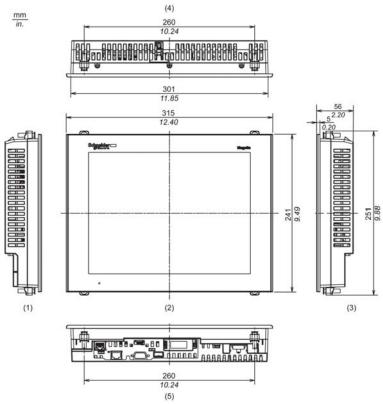
- Front
- 2 3 Right Side
- Top

# **External Dimensions: HMIGTO6315**



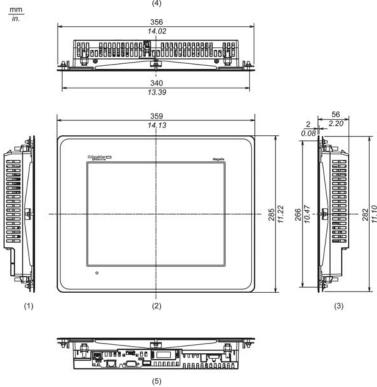
- 2 Right Side
- Top

### Installation with Installation Fasteners: HMIGTO6310



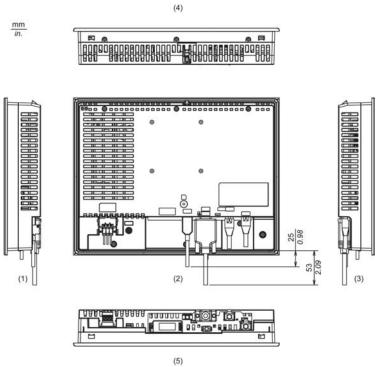
- Left Side
- 2 Front
- 3 Right Side
- 4 5 Тор
- Bottom

### Installation with Installation Fasteners: HMIGTO6315



- 1
- Left Side Front Right Side
- 2 3 4 5
- Top Bottom

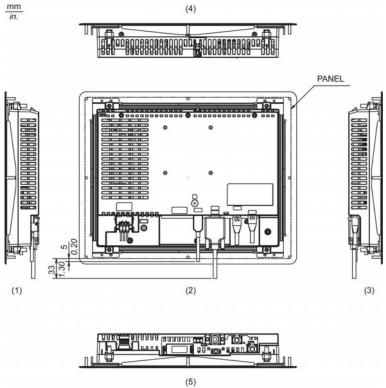
### **Dimensions with Cables: HMIGTO6310**



- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

### **Dimensions with Cables: HMIGTO6315**

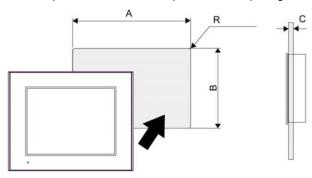


- 1 Left Side
- 2 Rear
- 3 Right Side
- 4 Top
- 5 Bottom

**NOTE:** All the above values are designed with cable bending in mind. The dimensions given here are representative values depending on the type of connection cable in use. Therefore, these values are intended for reference only.

### **Panel Cut Dimensions**

Create a panel cut and insert the panel into the opening from the front.

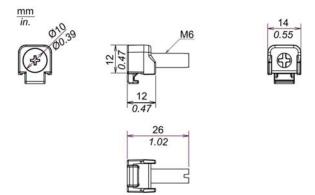


	A	В	С	R
HMIGTO6310	301.5 mm (+1, -0 mm) (11.87 [+0.04, -0 in.])	227.5 mm (+1, -0 mm) (8.96 in. [+0.04, -0 in.])	1.65 mm (0.060.2 in.)	3 mm (0.12 in.) maximum
HMIGTO6315	340.5 mm (+1, -0 mm) (13.41 [+0.04, -0 in.])	266.5 mm (+1, -0 mm) (10.49 in. [+0.04, -0 in.])		

NOTE: Before designing the panel cut, refer to Installation (see page 120).

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# **Installation Fastener Dimensions**



# **Chapter 5**

# **Installation and Wiring**

# What Is in This Chapter?

This chapter contains the following sections:

Section	Торіс	Page
5.1	Installation	120
5.2	Wiring Principles	125
5.3	SD Card Insertion/Removal	131
5.4	USB Cable Clamp	136

# Section 5.1 Installation

### **Installation Procedures**

#### Introduction

The installation fasteners are required when installing the panel.

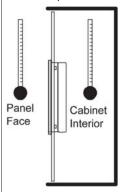
Mount the panel in an enclosure that provides a clean, dry, robust and controlled environment. (HMIGTO except HMIGTO2315/HMIGTO5315/HMIGTO6315: IP65, Type 1, Type 4X [Indoor Use Only] or Type 13 Enclosure. HMIGTO2315/HMIGTO5315/HMIGTO6315: IP66k, Type 1, Type 4X [Indoor Use Only] or Type 13 Enclosure.)

### **Installation Requirements**

Check that the installation wall or cabinet's surface is flat, in good condition and has no jagged edges. Metal reinforcing strips may be attached to the inside of the wall, near the panel-cut, to increase its rigidity.

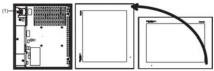
Decide on the thickness of the enclosure wall, based on the level of strength required: 1.6...5 mm (0.06...0.2 in.).

Be sure that the surrounding air temperature and the ambient humidity are within their designated ranges. Surrounding air temperature: 0 to 50  $^{\circ}$ C (32 to 122  $^{\circ}$ F) or 0 to 55  $^{\circ}$ C (32 to 131  $^{\circ}$ F) (please see the Environment Specifications for your HMIGTO); ambient humidity: 10 to 90%RH; wet bulb temperature: maximum 39  $^{\circ}$ C [102  $^{\circ}$ F]. When installing the panel in a cabinet or enclosure, the surrounding air temperature is the cabinet's or enclosure's internal temperature.



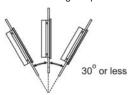
Be sure that heat from surrounding equipment does not cause the panel to exceed its standard operating temperature.

When mounting the panel vertically, ensure that the right side of the unit faces up. In other words, the power connector should be at the top.



1 Power connector

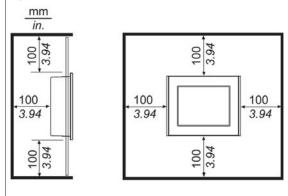
When installing the panel in a slanted position, the panel face should not incline more than  $30^{\circ}$ .



When installing the panel in a slanted position with an incline more than  $30^{\circ}$ , the ambient temperature must not exceed  $40^{\circ}$  C ( $104^{\circ}$  F). You may need to use forced air cooling (fan, A/C) to ensure the ambient operating temperature is  $40^{\circ}$  C or less ( $104^{\circ}$  F or less).

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For easier maintenance, operation and improved ventilation, install the panel at least 100 mm (3.94 in.) away from adjacent structures and other equipment as shown in the following illustration:



The holes on the rear of the panel (except HMIGTO1300/1310) do not correspond to VESA 75 mm standards. Do not attach the panel to a commercial-type VESA arm.

# Panel Mounting Procedure: (except HMIGTO2315/HMIGTO5315/HMIGTO6315)

# NOTICE

# PANEL UNSTEADY WHEN UNSECURED

Keep HMIGTO stabilized in the panel-cut while you are installing or removing the screw fasteners.

Failure to follow these instructions can result in equipment damage.

Step	Action
1	Place the panel on a clean and level surface with the display facing downward.
2	Check that the panel's gasket is seated securely into the gasket's groove, which runs around the perimeter of the panel frame.
3	Cut a hole in the installation panel as defined by the HMIGTO's panel cutout dimensions.  HMIGTO1300/HMIGTO1310 (see page 48)  HMIGTO2300/HMIGTO2310 (see page 66)  HMIGTO3510/HMIGTO4310 (see page 82)  HMIGTO5310 (see page 99)  HMIGTO6310 (see page 116)
4	Insert the HMIGTO into the panel-cut.

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# Step Action 5 Insert the installation fasteners into the HMIGTO's insertion slots on the top and bottom sides (left and right sides for the HMIGTO1300/1310). Slide the fasteners to the back. If the fasteners are not correctly attached, the HMIGTO may shift or fall out. Installation Panel HMIGTO2310 Slots 00000000000 HMIGTO1310 Insert each of the fasteners shown below. Make sure you pull the fastener back until it is flush with the rear of the attachment hole insert. 7 Use a Phillips screwdriver to tighten each fastener screw and secure the panel in place. The necessary torque is 0.5 Nm (4.4 lb•in).

# **NOTICE**

### **BROKEN ENCLOSURE**

- Do not exert more than 0.5 Nm (4.4 lb•in) of torque when tightening the fastener's screws.
- Use on flat surface of a Type 1, Type 4X (Indoor Use Only) or Type 13 Enclosure.

Failure to follow these instructions can result in equipment damage.

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### Removal Procedure: (except HMIGTO2315/HMIGTO5315/HMIGTO6315)

Step	Action
1	Loosen the installation fasteners (4) from the HMIGTO.
2	Remove the HMIGTO slowly from the panel while pressing the projections on the top of the HMIGTO.
	<ul> <li>1 Projections</li> <li>NOTE:</li> <li>You could damage the HMIGTO if you try and remove it without holding down the projections.</li> <li>Watch your fingers so they do not get caught when holding down the projections.</li> </ul>

# **A** CAUTION

### **RISK OF INJURY**

Do not drop the HMIGTO when you remove it from the panel.

- Hold the HMIGTO in place after removing the fasteners.
- Use both hands.

Failure to follow these instructions can result in injury or equipment damage.

### HMIGTO2315/HMIGTO5315/HMIGTO6315 Panel Mounting Procedure

# **A** CAUTION

### **RISK OF INJURY**

Do not drop the HMIGTO when you install or remove it from the panel.

- Hold the HMIGTO in place after removing the M4 Hex nuts and brackets.
- Use both hands.

Failure to follow these instructions can result in injury or equipment damage.

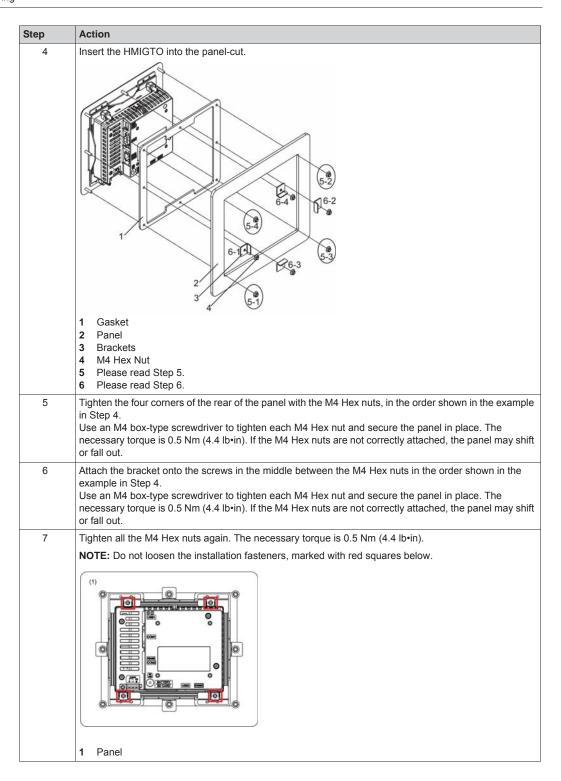
# **NOTICE**

### PANEL UNSTEADY WHEN UNSECURED

Keep panel stabilized in the panel-cut while you are installing or removing the M4 Hex nuts and brackets. Failure to follow these instructions can result in equipment damage.

Step	Action
1	Place the panel on a clean and level surface with the display facing downward.
2	Confirm that the panel's gasket is seated properly on the rear of the panel.
3	Cut a hole in the panel as defined by the HMIGTO panel cutout dimensions. HMIGTO2315 (see page 66) HMIGTO5315 (see page 99) HMIGTO6315 (see page 116)

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# **NOTICE**

### **BROKEN ENCLOSURE**

- Do not exert more than 0.5 Nm (4.4 lb•in) of torque when tightening the M4 Hex nuts.
- Use on flat surface of a Type 1, Type 4X (Indoor Use Only) or Type 13 Enclosure.

Failure to follow these instructions can result in equipment damage.

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# **Section 5.2**Wiring Principles

### Overview

This section presents the HMIGTO wiring principles.

# What Is in This Section?

This section contains the following topics:

Topic	Page
Connecting the Power Cord	126
Connecting the Power Supply	128
Grounding	130

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### **Connecting the Power Cord**

# **A** WARNING

#### **EXCESSIVE ELECTROMAGNETIC INTERFERENCE**

- When the functional ground (FG) terminal is connected, be sure the wire is grounded. Not grounding
  the HMIGTO can result in excessive Electromagnetic Interference (EMI). Grounding is required to
  meet EMC level immunity.
- Remove power before wiring the HMIGTO's power terminals.
- The DC model uses only 24 Vdc power. Using any other level of power can damage both the power supply and the HMIGTO.
- Since the HMIGTO is not equipped with a power switch, be sure to connect a power switch to the
  power supply.
- Be sure to ground the HMIGTO's FG terminal.
- Replace and secure all elements of the system before applying power to the HMIGTO.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

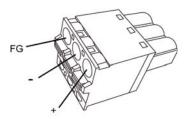
NOTE: The shield ground (SG) and FG terminals are connected internally in the panel.

#### **DC Power Cord Preparation**

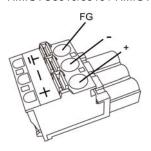
- Make sure the ground wire is either the same or heavier gauge than the power wires.
- Do not use aluminum wires in the power supply's power cord.
- If the ends of the individual wires are not twisted correctly, the wires may create a short circuit.
- Wherever possible, use wires that are 0.75 to 2.5 mm<sup>2</sup> (AWG 18 13) for the power cord, and twist the
  wire ends before attaching the terminals.
- The conductor type is solid or stranded wire.
- Field wiring terminal marking for wire type (75 °C [167 °F] copper conductors only).

### DC Power Supply Connector (Plug) Specifications: Spring Clamp Terminal Blocks

HMIGTO1300/1310 / HMIGTO2300/2310/2315 / HMIGTO3510/4310



### HMIGTO5310/5315 / HMIGTO6310/6315



Connection	Wire
+	24 Vdc
-	0 Vdc
FG	Grounded terminal connected to the panel chassis.

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### How to connect the DC Power Cord

Step	Action
1	Confirm the power cord is not connected to the power supply.
2	Check the rated voltage and remove the "DC24V" sticker on the DC power supply connector.
3	Remove 10 mm (0.39 in.) of the vinyl membrane off the ends of the power cord wires.
4	If using stranded wire, twist the ends. Tinning the ends with solder reduces risk of fraying and ensures good electrical transfer.
5	Push the Opening button with a small and flat screwdriver to open the desired pin hole.
6	Insert each pin terminal into its corresponding hole. Release the Opening button to clamp the pin in place. HMIGTO1300/1310 / HMIGTO2300/2315 / HMIGTO3510/4310  Opening Button  DC Power Cord  DC Power Cord  DC Power Sold  HMIGTO5310/5315 / HMIGTO6310/6315  Opening Button  Opening Button  FG
7	After inserting all three pins, insert the power plug into the power connector on the panel.

#### NOTE:

- Do not solder the wire directly to the power receptacle pin.
- To prevent the possibility of a terminal short, use a pin terminal that has an insulating sleeve.
- You can connect the DC power supply connector for HMIGTO1300/1310, HMIGTO2300/2310/2315, or HMIGTO3510/4310 to HMIGTO5310/5315 or HMIGTO6310/6315 units. However, the reverse is not possible. You cannot connect the DC power supply connector for HMIGTO5310/5315 or HMIGTO6310/6315 to HMIGTO1300/1310, HMIGTO2300/2310/2315, or HMIGTO3510/4310 units.

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### **Connecting the Power Supply**

#### **Precautions**

- You must use a 24 Vdc input unit with a Class 2 power supply.
- To increase the electromagnetic noise resistance, make sure you twist the ends of the power cord wires before connecting them to the power plug.
- The panel's power supply cord should not be bundled with or kept close to main circuit lines (high voltage, high current), or input/output signal lines.
- Connect a lightning surge absorber to handle power surges.
- To reduce electromagnetic noise, make the power cord as short as possible.

# **▲** WARNING

### SHORT CIRCUIT, FIRE, OR UNINTENDED EQUIPMENT OPERATION

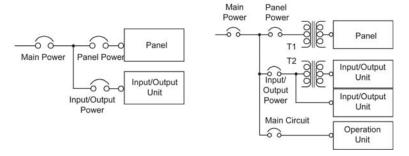
Avoid excessive force on the power cable to prevent accidental disconnection

- Securely attach power cables to the HMIGTO or cabinet.
- Use the designated torque to tighten the unit terminal block screws.
- Install and fasten the HMIGTO on installation panel or cabinet prior to connecting power supply and communication lines.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

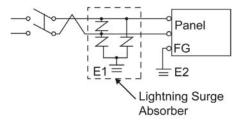
### **Power Supply Connections**

When supplying power to the panel, separate the input/output and power lines, as shown.



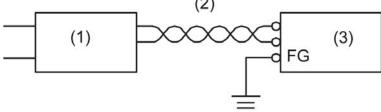
### NOTE:

The following shows a lightning surge absorber connection:



- Ground the surge absorber (E1) separately from the panel (E2).
- Select a surge absorber that has a maximum circuit voltage greater than that of the peak voltage of the power supply.

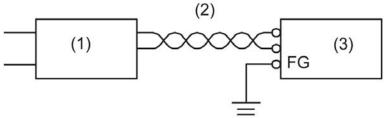
If the supplied voltage exceeds the panel range, connect a constant voltage transformer.



- 1 Constant voltage transformer
- 2 Twisted-pair cord
- 3 panel

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Select a power supply low in noise for between the line and ground. If there is an excess amount of noise, connect an insulating transformer.



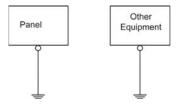
- 1 Insulating transformer
- 2 Twisted-pair cord
- 3 panel

**NOTE:** Use constant voltage and insulating transformers with capacities exceeding the Power Consumption value.

### Grounding

### **Exclusive Grounding**

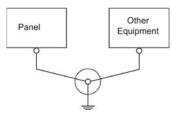
When supplying power to the panel, separate the input/output and power lines as shown below. Connect the frame ground (FG) terminal on the power plug to an exclusive ground.



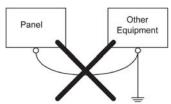
### **Precautions**

Electromagnetic Interference (EMI) can be created if the devices are improperly grounded. EMI can cause loss of communication. Do not use common grounding, except for the authorized configuration described below. If exclusive grounding is not possible, use a common grounding point.

### Correct grounding



### Incorrect grounding



- Check that the grounding resistance is 100 Ω or less.\*1
- The FG wire should have a cross sectional area greater than 2 mm<sup>2</sup> (AWG 14) <sup>(1)</sup>. Create the connection point as close to the panel as possible, and make the wire as short as possible. When using a long grounding wire, replace the thin wire with a thicker wire, and place it in a duct.
- FG and SG terminals are internally connected in the panel. When connecting an external device to the panel using the SG terminal, check that you do not create a short-circuit loop when you set up the system.

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 $<sup>^{*1}</sup>$  Observe local codes and standards. Ensure the ground connection has a resistance of 100  $\Omega$  and that the ground wire has a cross-section of at least 2 mm<sup>2</sup> or AWG 14.

# Section 5.3 SD Card Insertion/Removal

### What Is in This Section?

This section contains the following topics:

Торіс	Page
Introduction	132
Inserting the SD Card	133
Removing the SD Card	134
SD Card Data Backup	135

### Introduction

# **NOTICE**

### LOSS OF DATA

When using the HMIGTO and a SD Card, observe the following to avoid losing valuable data:

- Since accidental data loss can occur at any time, back up HMIGTO screen and SD Card data regularly. Once HMIGTO data is lost, it cannot be recovered.
- While a SD Card is accessed, do not turn OFF or reset the HMIGTO, and do not insert or remove the SD Card. Doing so could damage the SD Card, or corrupt its data.
- Before using the SD Card, familiarize yourself with the SD Card's front and rear face orientation, as
  well as the position of the SD Card connectors. If the SD Card is not positioned correctly when inserted
  into the HMIGTO, the card's internal data and HMIGTO could become damaged.

Failure to follow these instructions can result in equipment damage.

# NOTICE

### LOSS OF DATA

When handling the SD Card, follow the instructions below to prevent internal data on the SD Card from being destroyed or a SD Card malfunction from occurring:

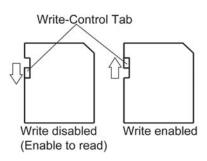
- Avoid storing the SD Card where there is static electricity or electromagnetic waves.
- Avoid storing the SD Card in direct sunlight, near a heater, or other locations where high temperatures can occur.
- Do not bend the SD Card.
- Do not drop or strike the SD Card against another object.
- . Keep the SD Card dry.
- Do not touch the SD Card connectors.
- Do not disassemble or modify the SD Card.
- Use only SD Cards formatted using FAT or FAT32. The HMIGTO does not recognize NTFS formatted SD Cards. Format the SD Card on your computer using FAT or FAT32.

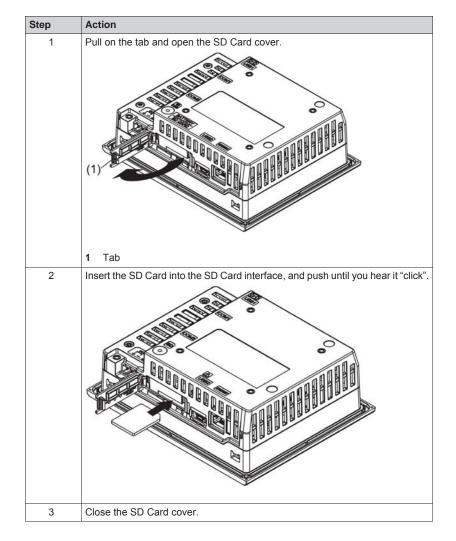
Failure to follow these instructions can result in equipment damage.

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#### **Inserting the SD Card**

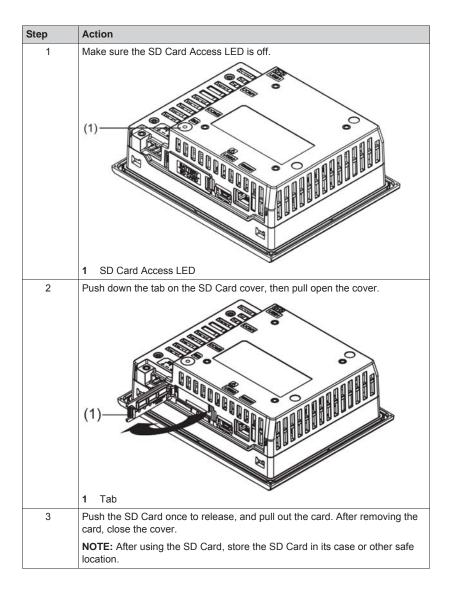
**NOTE:** As shown in the image below (example on the left-hand side), you can set the Write-Control Tab to prevent write operations to the SD Card. Push the tab up, as shown in the example on the right-hand side, to release the lock and enable writing to the SD Card. Before using a commercial-type SD Card, read the manufacturer's instructions.





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#### **Removing the SD Card**



#### **SD Card Data Backup**

To make your backups, you can either insert the SD Card directly into the SD Card interface on your computer, or use a commercially available SD Card reader.

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# Section 5.4 USB Cable Clamp

#### Overview

This section presents the USB cable clamp.

#### What Is in This Section?

This section contains the following topics:

Торіс	Page
USB Cable Clamp for USB (Type A)	137
USB Holder for USB (mini-B)	139

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#### **USB Cable Clamp for USB (Type A)**

#### Introduction

When using a USB device, attaching a USB cable clamp to the USB interface to prevent the USB cable from being disconnected.

# **A** DANGER

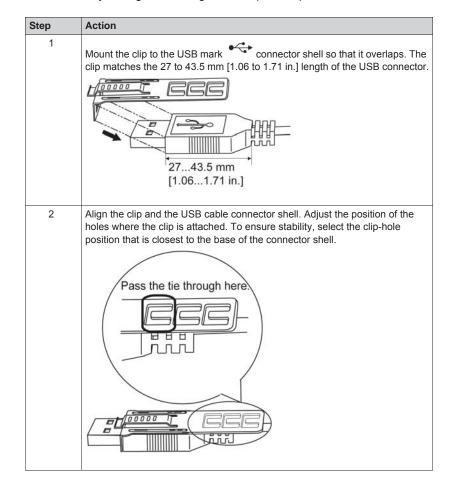
#### POTENTIAL FOR EXPLOSION

- Verify the power, input, and output (I/O) wiring are in accordance with Class I, Division 2 wiring methods.
- Substitution of any components may impair suitability for Class I, Division 2.
- Confirm that the USB cable has been fixed with the USB cable clamp before using the USB interface.
- Remove power before attaching or detaching any connectors to or from the unit.

Failure to follow these instructions will result in death or serious injury.

#### **Attaching the USB Cable Clamp**

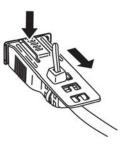
NOTE: Watch your fingers. The edge of the clip is sharp.



Step	Action		
3	As shown, pass the tie through the clip hole. Next, turn the tie and pass it through the head so that the USB cable can pass through the center of the tloop. The clip is now attached to the USB cable.		
	NOTE:  Check the direction of the head beforehand. Make sure the USB cable is through the center of the tie loop and that the tie can pass through the head.  You can substitute the tie provided with commercially available ties with a width of 4.8 mm [0.19 in.] and thickness of 1.3 mm [0.05 in.].		
4	While pressing the grip on the clip, insert the cable from step 3 all the way into the USB host interface. Make sure that the clip tab is secured to the USB cable attached to the HMIGTO.		

#### Removing the USB Cable

Remove the USB cable while pushing the grip section of the clip.



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#### **USB Holder for USB (mini-B)**

#### Introduction

When using a USB device, you can attach a USB holder to the USB (mini-B) interface to prevent the USB cable from being disconnected.

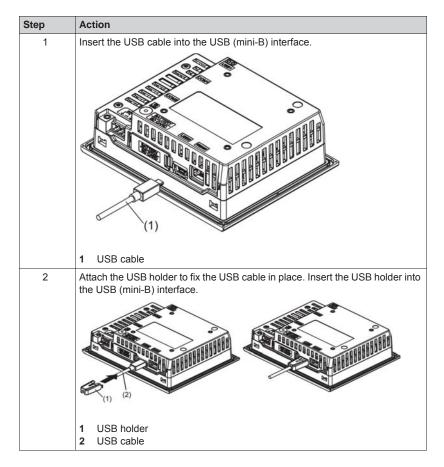
# **A** DANGER

#### POTENTIAL FOR EXPLOSION

- Verify the power, input, and output (I/O) wiring are in accordance with Class I, Division 2 wiring methods.
- Substitution of any components may impair suitability for Class I, Division 2.
- Confirm that the USB cable has been fixed with the USB cable clamp before using the USB interface.
- Remove power before attaching or detaching any connectors to or from the unit.

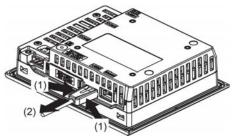
Failure to follow these instructions will result in death or serious injury.

#### Attaching the USB Holder



#### Removing the USB Holder

Remove the USB holder by pressing the tabs from the sides.



- USB holder USB cable

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# **Chapter 6 Maintenance**

#### Overview

This chapter explains how to maintain your panel.

#### What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Regular Cleaning	142
Replacing the Installation Gasket	143
Periodic Check Points	145
Replacing the Primary Battery	146

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#### **Regular Cleaning**

#### Cleaning the display

#### **NOTICE**

#### **EQUIPMENT DAMAGE**

- Power off the panel before cleaning it.
- Do not use hard or pointed objects to operate the touch panel as you may damage the panel surface.
- Do not use paint thinner, organic solvents, or a strong acid compound to clean the unit.

Failure to follow these instructions can result in equipment damage.

When the surface or the frame of the display gets dirty, soak a soft cloth in water with a neutral detergent, wring the cloth tightly and wipe the display.

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#### **Replacing the Installation Gasket**

#### Overview

The installation gasket provides protection against dust and moisture.

#### **NOTICE**

#### **GASKET AGING**

- Inspect the gasket periodically as required by your operating environment to keep the initial IP level.
- Change the gasket at least once a year, or as soon as scratches or dirt become visible.

Failure to follow these instructions can result in equipment damage.

#### **Installing the Installation Gasket**

**NOTE:** For instructions on how to install the installation gasket when using HMIGTO2315/HMIGTO5315/HMIGTO6315, see HMIGTO2315/HMIGTO5315/HMIGTO6315 Panel Mounting Procedure (see page 123).

Stage	Description		
1	Place the panel on a flat, level surface, with the display face pointing down.		
2	Remove the gasket from the panel.		
3	Attach the new gasket to the panel. Position the gasket in the installation groove so that the gasket seam is at the bottom of the panel. First, insert the gasket into the 4 corners, in the order shown in the image below. Then, insert the rest of the gasket into the installation groove.  NOTE:  The center of the panel bezel's installation groove is ribbed. Make sure you insert the gasket all the way in without catching the ribbed sections.  When using a tool to insert the gasket, make sure the tool does not catch the rubber gasket and cause a tear.		
	Gasket Seam Installation Groove		
4	The upper surface of the gasket should protrude approximately 2.0 mm (0.06 in.) from the groove. Check the gasket is inserted correctly before installing the HMIGTO into a panel.		
	2.5 0.1 mm in.		

The gasket must be inserted correctly into the groove for IP65f moisture resistance for the panel. (IP66k moisture resistance for HMIGTO2315/HMIGTO5315/HMIGTO6315.)

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# **A** CAUTION

#### **EQUIPMENT DAMAGE**

- Since the gasket is flexible but not elastic, be careful not to stretch it unnecessarily.
  Make sure the gasket seam is not inserted into any of the panel corners.
- Insert the gasket in the installation groove

Failure to follow these instructions can result in injury or equipment damage.

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#### **Periodic Check Points**

#### **Operation Environment**

- Is the operating temperature within the allowable range? Refer to Environmental Specifications (see page 38), (see page 52), (see page 70), (see page 86), (see page 103).
- Is the operating humidity within the specified range? (10%RH to 90%RH, dry bulb temperature of 39 °C [102.2 °F] or less)
- . Is the operating atmosphere free of corrosive gasses?

When the HMIGTO is inside a panel, the ambient environment refers to the interior of the panel.

#### **Electrical Specifications**

Is the input voltage appropriate?

- 100 Vac to 240 Vac 50/60 Hz
- 19.2 Vdc to 28.8 Vdc

#### **Related Items**

- Are all power cords and cables connected properly? Are there any loose cables?
- Are all mounting brackets holding the unit securely?
- Are there scratches or traces of dirt on the installation gasket?

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#### **Replacing the Primary Battery**

#### Introduction

The replacement battery HMI ZGBAT (sold separately) for the primary battery in the HMIGTO is available from Schneider Electric.

NOTE: The HMIGTO1300/1310 and HMIGTO2300 are not equipped with a primary battery.

# A A DANGER

#### HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow the procedures step by step to replace the battery correctly and safely.
- Before replacing the battery, turn OFF the HMIGTO's power.

Failure to follow these instructions will result in death or serious injury.

## **A** DANGER

#### **EXPLOSION, FIRE, OR CHEMICAL HAZARD**

- Use only the replacement battery HMI ZGBAT manufactured by Schneider Electric.
- · Do not cause a short circuit.
- · Recycle or properly dispose of used batteries.

Failure to follow these instructions will result in death or serious injury.

#### NOTICE

#### LOSS OF DATA

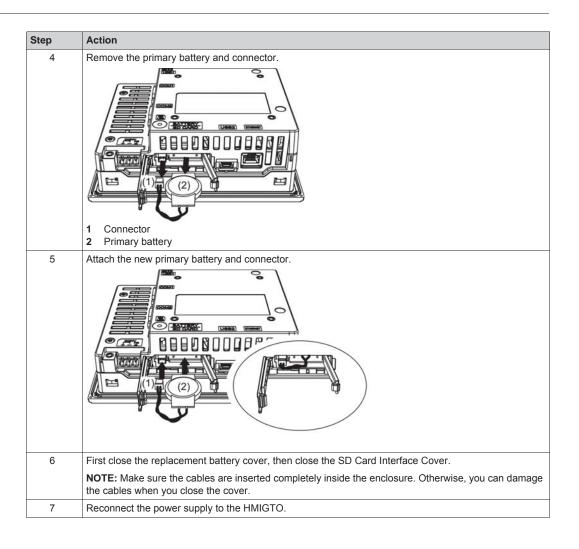
The primary battery is non-rechargeable, and is used for data backup of memory and the internal clock. If the primary battery is depleted, the backup data is lost. One month before the primary battery is completely depleted, a message will appear to indicate it is time to replace the primary battery.

- Replace the battery within one month after the message appears. Otherwise, backup data may be lost.
- Complete replacing the battery within ten minutes of shutting down the HMIGTO.
- The primary battery replacement time (within a month after the message appears) is only a guideline.
   When backup SRAM data and clock data is lost after the message appears, Schneider Electric does not perform data recovery/retrieval. Schneider Electric does not accept any responsibility for the loss of data.
- Replace the primary battery regularly every five years after you purchase the HMIGTO.

Failure to follow these instructions can result in equipment damage.

Step	Action
1	Disconnect the power supply from the HMIGTO.
2	Touch the housing or ground connection (not the power supply) to discharge any electrostatic charge from your body.
3	Open the SD Card Interface Cover by pressing its tab. Next, open the Replacement Battery Insertion Cover by pressing its tab.  1 SD Card Interface Cover / Tab 2 Replacement Battery Insertion Cover / Tab

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# Index



A	IVI
Accessories, 21	maintenance, 141
	check points, 145
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LS	19279	Switch, Level, Mech Float, Narrow Angle, N.C., YEL	N/C, Yellow float
LS	M1343	Switch, Level, Mech Float, Narrow Angle, N.O., Blue	Tilt Float Level Switch w 40' cable
LS-101/2/3	19279	Switch, Level, Mech Float, Narrow Angle, N.C., YEL	N/C, Yellow float
LSHH- 101.102/103 LSHH-301 LSHH-401 LSHH-501 LSHH-502 LSHH-601/602	19279	Switch, Level, Mech Float, Narrow Angle, N.C., YEL	N/C, Yellow float
LSLL-301/401/ 501/502	M1108	Switch, Level, Mech Float, Wide Angle, N.O., Red	13A, SPST, N/O, Red



# Warrick® Series M Mechanical Tilt Float Switch

#### **Installation and Operation Bulletin**

#### **Specifications**

Cord	16 gauge, 2 or 3 conductor SJOW, Oil Resistant CPE	
Contact Rating 13 amp @ 120/240 VAC, 1/2hp		
Contact Design SPST, Normally Open or Normally Closed, Common with N.O. & N.C. (Form C		
Temperature Rating	32°F (0°C) to 194°F (90°C) Dry and 140°F (60°C) Water Resistant	
Overall Weight	1.0 lbs. (not including weight)	
Tether Method	Tie-wrap nylon, weight: 2.5 lbs.	
Approvals	U.L. Recognized, CSA Certified	

#### Installation

#### Tether Tie-Wrap (Fig 1)

Attach cord, using a tie-wrap, to a stationary structure. This is known as the tether point, it will determine the pumping range. The farther the float is placed from the tether point, the greater the pumping range. The minimum distance that the float should be placed from the tether point is 3 inches.

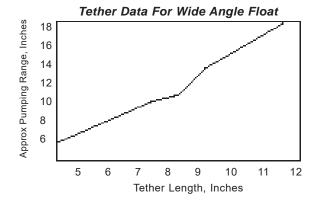
#### Tether-Weight (Fig 2)

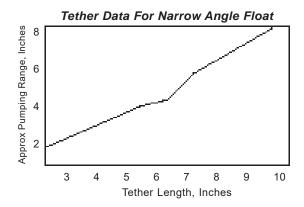
Place tension-brand over the cord before installation. Place the weight at the desired position and secure with the tension-band. This position will determine the pumping range. The farther the float is placed from the tether point, the greater the pumping range. The minimum distance that the float should be placed from the tether point is 3 inches.

#### Notes:

- 1. To Prevent Motor Burnout In a pumpdown application make sure the turnoff level is at least 2 inches above the intake of the submersible pump.
- Securing Tether Points Make sure levels are correct and that floats are free from any obstructions before securing tether points.

# Determine tether point using charts below as a reference Tether Point Pumping Range Range





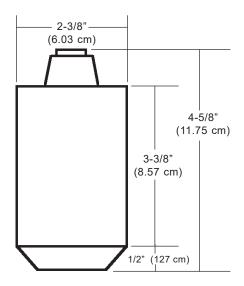
#### Notes:

Figure 1

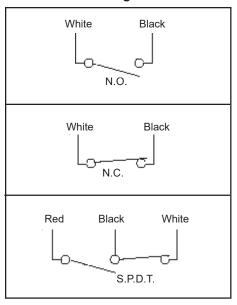
- 1. Narrow angle pumping range is approximately 2 In. to 8 In.
- 2. Wide angle pumping range is approximately 5 ln. to 18 ln.

Figure 2

#### **Dimensions**



#### **Contact Configurations**



#### Important Points:

- Gems products must be maintained and installed in strict accordance with the National Electrical Code and the applicable Gems Product Instruction Bulletin that covers installation, operation and proper maintenance. Failure to observe this information may result in serious injury or damages.
- For hazardous area applications involving such things as, but not limited to, ignitable mixtures, combustible dust and flammable materials, use an appropriate explosion proof enclosure or intrinsically safe interface device.
- Please adhere to the pressure and temperature limitations shown throughout this catalog for our level and flow sensors.
   These limitations must not be exceeded. These pressures and temperatures take into consideration possible system surge pressures/temperatures and their frequencies.
- Selection of materials for compatibility with the media is critical to the life and operation of Gems products. Take care in the proper selection of materials of construction, testing is required.
- NSF-approved sensors are made of materials approved for potable water applica tions according to Standard 61.
- Stainless steel is generally regarded as safe by NSF and FDA.
- Life expectancy of switch contacts varies with application. Contact Gems if life cycle testing is required.
- Ambient temperature changes do affect switch set points, since the gravity of a liquid can vary with temperature.
- Our sensors have been designed to resist shock and vibration. However, shock and vibration should be minimized.
- Filter liquid media containing particulate and/or debris to ensure the proper operation of our products.
- Electrical entries and mounting points in an enclosed tank may require liquid/vapor sealing.
- Our sensors must not be field-repaired.
- Physical damage sustained by product may render it unserviceable.

#### Return Policy

Returns are accepted on stock items up to 30 days from date of order. You must contact our Returns Department for a Return Authorization (RA) number. Return the goods - freight prepaid - in the original container and include original packing slip. C. O. D. returns are not accepted. Gems reserves the right to apply restocking charges.

Tel: 860-793-4357 Fax: 860-793-4563



Gems Sensors Inc. One Cowles Road Plainville, CT 06062-1198 Tel: 860-793-4579 Fax: 860-793-4580 LSHH - Switch, Level, Almeg, Vertical, ATB3-48B LSHH-7901 - "LSLL-301/401/ 501/502"M1108Switch, Level, Mech Float, Wide Angle, N.O., Red13A, SPST, N/O, Red Switch, Level, Almeg, Vertical, ATB3-48B

# Level Switch - Small Size - Heavy Duty



The ATB3 is designed for high or low level alarm or switch point applications in rugged situations similar to oil tank reservoirs or industry vessels that require a more robust level switch. Notice the larger brass one piece machined hex to get a wrench on - this model also has an optional brass set screw locking collar in place of the clip.

Internal reed switch selection is the same Almeg quality standard but we've beefed up the external part as well as fully encapsulated the reed switch to maintain a complete moisture free environment. The leads are wire wrapped (not clipped) soldered and heat shrink sealed to the reed switch before encapsulating.

The TRUE closed cell Buna float will not swell or take on moisture - even if cut or drilled. It is designed like a tight bee hive or honey comb construction.

100% of our controls are tested before shipping.

The ATB3 is available in a single order or OEM applications.

LT-301/501 - Transmitter, Pressure, KPSI 750 series 0-10ft H20Part Number 750S14D4A004.334000.000B10015B Level Transducers KP51® USEL'S Manual February 2010 <sup>©</sup>This User's Manual is a copyright product of Pressure Systems, Inc., 2009.

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# **Our Company**

Pressure Systems is an ISO9001:2000 certified U.S. manufacturer of submersible and non-submersible (above ground) pressure transducers for environmental, industrial and municipal applications. Our KPSI<sup>™</sup> Level and Pressure Transducers have been specified in thousands of projects throughout the United States, Canada and Europe by geologists, system integrators, national engineering firms and a variety of government agencies. Typical applications include, but are not limited to, pump control, tank level monitoring, sewage lift station operation, reservoirs, weirs, flumes, site remediation, watershed management, storm water/well monitoring, pump/pipeline pressures and compressor pressures.

### Website and E-Mail

You may visit our website at www.PressureSystems.com to look at our latest new product releases, application notes, product certifications and specifications, as well as Intrinsic Safety control installation drawings. E-mail your questions and comments to us: sales@PressureSystems.com.

#### E-commerce

Orders may be placed on-line by visiting our e-commerce site (www.LEVELandPRESSURE.com) or by contacting the factory or local representative.

# **Applicable Products**

This manual provides information applicable to the use of the following KPSI Level and Pressure Transducers:

#### Level Transducers (Submersible)

Series 700/710/720/730/735

Series 320/330/335/340

Series 300DS Series 705 Series 750 Please note: Series 500 and Series 550 (waterMONITOR) have separate manuals.

#### **Pressure Transducers (Non-submersible)**

Series 27/28/30

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# 1.0 Product Description

#### **General Characteristics**

KPSI<sup>TM</sup> Level and Pressure Transducers use isolated-diaphragm sensors that are specifically designed for use with hostile fluids and gases. These sensors utilize a silicon pressure cell that has been fitted into a stainless steel or titanium package with an integral, compliant stainless steel or titanium barrier diaphragm. This sensor assembly is housed in a rugged 316 stainless steel or titanium case which provides for a variety of level ranges from 2.3 ft (0.75 m)  $H_2O$  through 4614 ft (1408 m)  $H_2O$  and pressure inputs from 0-1 (7 kPa) through 0-15000 psi (103 mPa). Our devices feature internal signal conditioning. Standard outputs are 4-20 mA and VDC.

All units containing active electronic components have surge and reverse polarity protection. For ease of use in the field, our transducers are permanently laser engraved with our logo and name, wiring information, part number (P/N), serial number (S/N), date of manufacture (DOM), range, excitation and output. Transducers are offered in diameters of 1.0 (25 mm) and 0.75 inches (19 mm).

#### **Care and Handling**

Our transducers are designed for rugged use. However, they need protection from over pressure and sharp impact. When lowering them into a liquid, penetrate the surface slowly and only to the depth necessary. Avoid dropping the unit from above the surface. Clean all transducers by rinsing them in a mild detergent. Direct probing of the diaphragm or attempts to remove protective screens will damage the sensor, voiding the warranty.

#### Calibration

All transducers are shipped with calibration information unique to each transducer. Make sure you keep each calibration report. However, should you misplace your calibration sheet, you can contact the factory and request a duplicate. All KPSI™ Transducer calibrations are traceable to the National Institute of Standards and Technology (NIST).

#### **Approvals**

Most of our products have UL and FM certification for intrinsic safety. Their respective installation control drawings can be downloaded from our website. Several of our product lines also carry ABS approval. Most products are CE compliant to EN 61326-1:2006 and EN 61326-2-3:2006. CE compliant units are labeled accordingly.

# 2.0 Product Accessories and Options

#### **Nose Caps**

There are several different user-installable nose caps for the 700, 710, 720, 730, 735 submersible level transducers. The ported nose cap (Delrin) with #8-32UNC-2B threaded hole is best used where weights are required and for those installations where users may encounter sharp, protruding objects. The open-face nose cap which allows maximum contact with the liquid media is ideal for wastewater and "greasy" applications where clogging of the sensor is a concern. The piezometer nose cap allows the unit to be buried in saturated soil without damage to the sensor diaphragm. The 1/4" male NPT pressure nose cap is not only useful for calibration purposes but also allows the device to be used as a submersible or above ground pressure transducer.

## 810 SuperDry™ Vent Filter or 815 Aneroid Bellows

All submersible transducers with vented gauge format are supplied with a protective barrier that guards against moisture buildup in the cable vent tube. The 810 SuperDry  $^{\text{TM}}$  vent filter is installed free of charge and is guaranteed to operate maintenance free for one year. We also offer the 815 Aneroid Bellows as a maintenance free option that can be used on submersibles with accuracies of:  $\pm 1\%$ ,  $\pm 0.5\%$ , or  $\pm 0.25\%$  FSO. These barriers ensure reliable operation and long life as they protect sensitive electronic components from mildew and prevent the formation of a liquid column in the vent tube. Any such liquid column directly affects calibration of the transducer.

#### Sacrificial Anodes

Our sacrificial anodes are made from a special zinc alloy formulated to guarantee continued effectiveness over long periods. Because the anodes are 95% galvanic, they will not corrode unless there is an electrolytic demand. The anode maintains a high driving potential throughout its 12 month life, is self-sluffing and always exposes new zinc for the best possible protection. For those applications where cable buoyancy is a problem, the sacrificial anode can be substituted for hanging weights.

Sacrificial Anodes provide cathodic protection against galvanic corrosion for our submersible pressure transducers. Galvanic corrosion occurs when dissimilar metals are placed in contact with an electrolyte. This condition causes a potential difference to exist between the two metals, causing electron flow between them. Corrosion of the less corrosion-resistant metal is increased and attack of the more resistant metal is decreased. The 820 Sacrificial Anode is clamped to the exterior of a one-inch bore submersible transducer. We also offer a 1" diameter pencil anode, the 825, that attaches to the nose cap of either a 3/4" or 1" bore submersible transducer.

#### **Absolute/Sealed Gage Transducer**

The sealed gage option for submersible transducers eliminates the need for a vent filter. The standard output of a sealed gauge transducer is 4 mA at 14.70 psia. Before ordering a sealed gauge transducer, the customer should determine the altitude (above sea level) of the installation and inform PSI's Customer Service of this value before order entry. During manufacture, the output of the transducer will be adjusted to compensate for the altitude difference, if applicable.

#### Polyurethane & ETFE Jacketed Cable

Most installations of our submersible level transducers connect our polyurethane or ETFE cable to a junction box. From this junction box (P/N 840), users typically run their own cable to the required instrumentation. Polyurethane-jacketed cable is used for most applications while ETFE material is recommended for more aggressive environments.

Specifications for our standard polyurethane and ETFE jacketed cable are as follows:

Specifications	Standard Submersible Cable	Standard Non-Submersible Cable
Weight	0.05 lbs/ft (0.07 kg/m)	0.025 lbs/ft (0.035 kg/m)
Min. OD	0.28" (7.10 mm)	0.189" (4.8 mm)
Max OD	0.31" (7.87 mm)	0.19" (4.9 mm)
Conductors	4 - 22 AWG	22 AWG
Insulation Conductors Outer jacket	PVC Polyurethane or ETFE	Color coded PVC
Shield	36 gauge spiral tinned copper wire foil shield with drain wire	Aluminum/polyester foil facing outward
Vent Tube	Polyethylene, .060" ID (1.52 mm)	Drain wire 7/32 tinned copper

• Chemical resistance of polyurethane: Potable Water, Wastewater, Borax, Butane, Animal Fat, Carbonic Acid, Citric Acid, Cod Liver Oil, Corn Oil, Glycerin, Glycol, Mineral Oils, Potassium Nitrate, Potassium Sulfate, Silicone Oils, Stoddard Solvent, Tannic Acid (10), Tartaric Acid, Turbine Oil.

 Chemical resistance of ETFE: Acetic Acid (Glacial), Acetic Anhydride, Acetone, Aluminum Chloride, Anti-Freeze, Bromine, Calcium Chloride, Calcium Hydroxide, Chlorine, Copper Chloride, Ferrous Chloride, Hydrochloric Acid, Ketones, Lacquer Thinners, Sulfuric Acid.

The vented cable termination end is specially prepared at the factory to eliminate the potential for moisture migration. Where the lead wires emerge from under the jacket, there's potting material and a shrink tube "boot", every effort should be made to leave this feature intact. Should the cable be longer than needed for the installation, it is recommended that the excess length be accommodated in a service loop and that the potted end of the cable **NOT** be shortened.

The cable attached to this instrument is specifically engineered for submersible applications. The polyurethane outer jacket provides long term reliability under most conditions. The cable should be handled carefully, however, as the jacket may be subject to cutting should it be "raked" over extremely sharp edges. To guard against water incursion should an inadvertent minor cut occur, we have incorporated an exclusive "water block" feature immediately beneath the jacket. The cable is fully shielded, with the shield connected to the metal housing at the transducer end and terminated in a drain wire at the termination or user end. The shield should always be terminated to a good earth ground, unless the transducer is installed in an area where galvanic corrosion is known to be a serious problem.

#### **Lightning Protection**

Lightning and surge protection for VDC, SDI-12 and 4-20 mA output are available. This is achieved through the use of 2 protectors, one is integral to the transducer housing and one is provided for the outside line located at the surface and grounded to a DIN-Rail. Please remember this option must be factory installed at the time of order entry or as a factory upgrade. **This option cannot be installed in the field.** Lightning protection is also available for unit only. Contact customer service for details.

Featuring quick response and low clamping voltages, these devices protect against fast rising voltage transients as well as severe current surges associated with lightning discharges up to 20,000 amperes. Following a surge, the protector automatically restores the line to normal operation and awaits the next surge without having to reset a breaker or replace a fuse. The power supply needs to be limited to 150 mA to avoid lock up of the gas tube after a suppression event. Transducers installed with this option have a lifetime warranty against damage due to voltage surge.

Please note: When using the lightning protection option on 4-20 mA products, users should take into account the additional series resistance of this option when selecting the loop power supply. This option will increase total loop resistance by 88 Ohms.

#### 1/2" Male NPT Conduit Fitting

Submersible level transducers can be attached to a rigid conduit and the cable run through the conduit. To achieve this, all of our submersible transducers can be fitted with an optional ½" NPT male conduit fitting (specify "Electrical Connection Option 4" when ordering) where the cable exits the transducer. This fitting can be mated to a standard rigid conduit.

#### **Electrical Outputs**

We offer the industry standard 0-5 VDC and 4-20 mA outputs. In addition we also offer a variety of voltage output ranges.

#### **Reverse Signal Output**

For some applications, it is important to know how far the water is from the top of the tank or the surface of the ground. If specified by the customer, our factory can set the transducer so that zero pressure reads full scale electrical output and maximum pressure reads zero electrical output.

#### **Temperature Output**

A temperature output option is available for most transducers having 4-20 mA pressure output. The temperature sensor requires an excitation of 9-28 VDC and is calibrated for a temperature range of -20 to 60°C with an accuracy of ±4°C.

Output Option 6 (4-20mA output for -20 to  $60^{\circ}$ C) (mA Reading x 5) - 40 = Temperature  $^{\circ}$ C

Example: Reading is 20mA  $(20 \times 5) - 40 = 60^{\circ}\text{C}$ 

Reading is 12mA  $(12 \times 5) - 40 = 20^{\circ}$ C Reading is 4mA  $(4 \times 5) - 40 = -20^{\circ}$ C

#### Cable Hanger

We can supply an optional cable hanger (P/N 12-90-0931) to help end users secure the cable. The cable hanger can be positioned anywhere on the cable by pushing the ends together. Once positioned, the cable hanger expands and provides a snug grip on the cable.

When mounting the transducer in a well casing, the cable hanger can be secured to a hook on the well plate or an eye bolt may be attached to the side of the well casing. The cable hanger loop is then secured to the eye bolt by using any number of types of fasteners. A similar technique can be used when working in stilling wells for surface water level measurement. In this case, the loop-end of the cable hanger can be attached directly to a screw or bolt bored into the still well shelf.

#### **Submersible Cable Splicing Kit**

Our field-installable cable splice kit (P/N 830) allows you to splice polyurethane and ETFE submersible cable. It is most commonly used for well applications where the more expensive ETFE cable is required for suspension in corrosive media where the liquid level is fairly shallow, but the well is hundreds of feet in depth. It is also used in emergency situations where cable must be spliced together to get an application up and running.

# 3.0 Installation & Maintenance Tips



#### **General Installation Procedures**

The following is important installation and preventive maintenance information. Our Customer Service or Applications Engineering Support staff can provide additional instruction.

1. Transducer Anchors: Most users either suspend our submersible transducers in stilling wells or attach them to rigid conduit. This is done to prevent damage to the transducer from shock caused by water turbulence. It is not advisable to tie your transducer to a pump or to piping, as any problem with the transducer could require that the pump be pulled from the installation. This could prove to be very expensive. (Please refer to the Cable Anchoring Schemes drawing in Appendix A.)

Some applications use our optional bracket (P/N 49-06-00PC) to clamp the transducer to a fixed object (i.e., wall, ladder, step) or require the unit to be suspended without any protective still well or attachment device. In all installations, care should be taken to ensure no damage occurs to the cable.

- Transducer Submersion: Damage to submersible cable is one of the most frequent causes of transducer failure. Lower your transducer into the liquid slowly, making sure the cable does not drag over sharp edges and only to the depth necessary. Avoid dropping the unit from the surface. This does not apply to Series 27, 28, and 30 transducers.
- 3. SuperDry™ Vent Filter (Desiccant) or Aneroid Bellows Installation (For submersible transducers vented gage pressure format only) Always install a desiccant vent filter or aneroid bellows immediately after transducer installation. Failure to use one or the other could result in premature failure of the transducer; which would not be covered by warranty. If you use a desiccant filter, you should establish a regular maintenance schedule. You should change your vent filter when it is 75% spent (pink color). Replacement filters are available at a nominal cost from the factory. Do not remove the old vent filter until a new one is available. The most common failure mode of our transducers is moisture and corrosion damage due to lack of use or maintenance of the vent filter. This will allow air into the desiccant filter and allows the transducer to properly vent with changes in barometric pressure.

To install/replace either the aneroid bellows or the vent filter, simply unplug the old unit from the vent tube and plug the 0.062" x 1" stainless steel connector tube (supplied with each filter or bellows) into the vent tube. (Installation and mounting instructions are supplied with each aneroid bellows and vent filter.) The diagram on page 16 shows typical vent filter and aneroid bellows hookups.

- 4. **Cable Protection** An inexpensive way to protect the cable from damage is to order the submersible pressure transducer with a ½" conduit attachment. Connect an inexpensive flexible 5/8" garden hose to the ½" conduit fitting with an equally inexpensive female PVC ½" NPT x 3/4" NHT swivel fitting, available at your local hardware store
- 5. **Bending of Cable** Our polyurethane and ETFE jacketed cables are quite flexible. Care needs to be taken to ensure that when bending the cable to suit your installation you do not crimp the vent tube inside the cable. Consequently, do not bend the cable more than a radius of 1 inch.
- 6. **Cable Compression** Many users require a compression fitting to secure our ETFE and polyurethane jacketed cable as it enters a junction box. Care needs to be taken that you do not over-tighten the fitting so as to damage the cable.
- 7. **4-20 mA Wiring** When connecting a 2-wire 4-20 mA transducer to a typical power supply and mA meter, verify that the meter has an input impedance of at least 10 Ohms. If you are unsure of the input impedance, then a 10 Ohm resistor may be placed in series with the meter and transducer. Connect the + (red) lead of the transducer to the + terminal of the power supply. If the 10 Ohm resistor is required, connect it to the (black) lead of the transducer. Use a short length of 22 AWG or heavier wire to connect the + terminal of the meter to the resistor (if it is required) or the (black) wire of the transducer. Connect the terminal of the meter to the terminal of the power supply with a length of 22 AWG or heavier wire. Connect the drain wire from the transducer to a good earth ground. (See **Appendix**, page **14** for wiring diagram.) Please refer to "**Maximum Cable Lengths and Minimum Supply Voltage**" in **Appendix C**, page **22** to verify minimum loop supply voltage requirements.
- 8. **VDC Wiring** To connect a 3 wire VDC output transducer to a typical power supply and the voltmeter, connect the terminal of the power supply to the input terminal of the meter with a length of 22 AWG or heavier wire. Connect the excitation (black) lead of the transducer to the input terminal of the meter. Connect the + input terminal of the meter to the signal lead (white) of the transducer. Connect the + terminal of the power supply to the + lead (red) of the transducer. Connect the drain wire to a good earth ground. (See **Appendix A**, **page 14**.)
- 9. **The Model 750** comes standard with a field removable diaphragm protector (one-inch or 25 mm standoff). The diaphragm protector can easily be taken off by removing six (6) fasteners located on the bottom of the unit.
- 10. Sealed-Gage Transducer Configured For Altitude Above Sea Level Since sealed-gauge transducers are normally calibrated at sea level, there may be considerable error induced when used at a higher elevation. If the transducer was calibrated without taking into consideration the difference in atmospheric pressure at sea level and the higher elevation, an offset error will occur. In order to eliminate error due to this difference, the customer must identify the elevation where the transducer will be installed. The nominal atmospheric pressure at the location is calculated and the transducer will be ranged accordingly. Not all KPSI Transducers are available in a sealed pressure format. Please refer to the appropriate datasheet for availability.
- 11. **Position Sensitivity** The transducer should be installed so that the diaphragm located behind the nose cap is oriented in a vertical position, otherwise the unit could exhibit an offset.

#### **General Maintenance Tips for Submersible Transducers**

#### 1. Desiccant Maintenance



If you use a desiccant vent filter, you should establish a regular maintenance schedule. You should change your vent filter when it is 75% spent (pink color). Replacement filters are available at a nominal cost from the factory. Do not remove the old vent filter until a new one is available. Remember that Pressure Systems' improved 810 SuperDry™ Vent Filter are designed to be effective for at least one year before requiring replacement.

#### 2. Clogged Nose Piece or Dirty Diaphragm

Either of these conditions could result in erroneous readings from your transducer.



Your transducer may be cleaned in accordance with the procedures listed in step 4, below.

#### 3. Cleaning your transducer

Materials required:

- Plastic bowls 8-12 inches (200-300 mm) in diameter and 4-6 inches (100 - 150 mm) deep
- Supply of clean, lint-free cleaning rags
- 32 ounce bottle of "The Works-Tub and Shower Cleaner" (a mild detergent)
  manufactured by Lime-O-Sol Company in Ashley, IN 46705 and available locally
  through Wal-Mart, K-Mart, Target, and Ace Hardware stores at \$2 to \$4 per
  bottle

**Preparation:** Prior to cleaning your pressure transducer, ensure that all procedures have been followed in the proper cleaning of the cable and transducer to remove any hazardous materials. The vent filter (or bellows) must be properly attached. The cable should be coiled to ensure ease of handling and it must be protected against the possibility of accidental abrasion and/or penetration of the cable jacket by sharp objects. A lead length of 1 to 1 ½ feet (0.3 - 0.45 m) of cable from the transducer should be allowed to facilitate handling during cleaning. The protective covering (or similar protective device) that is shipped with each transducer should be attached to the transducer at all times. It should only be removed prior to installation or cleaning.

Your work surface needs to be clean and free of clutter and large enough to accommodate all materials required in addition to the transducer and cable. Fill one of the bowls with fresh water, one with a mild detergent mixed with water and the last with 16 ounces (0.45 kg) of "The Works".

#### Cleaning:

- Step 1: Holding the cable 6 inches (150 mm) from the transducer, immerse the unit in the bowl containing the mild detergent and stir for 20-30 seconds. Remove and rinse in the bowl containing the fresh water, using the same stirring motion used in the mild detergent. Rinse and wipe dry.
- Step 2: Holding the body of the transducer with one hand so that you are looking at the retaining screen protecting the sensor, carefully remove the sensor nose piece by simply unscrewing it from the transducer body. Do not touch the sensor diaphragm with your finger or any other object. Also, do not try to dry the inside portion of the transducer, as you risk damaging the pressure sensor.
- Step 3: Place the transducer in a vertical position with the sensing end facing downward in the bowl containing "The Works" solution for approximately 15-20 seconds. Rinse in the bowl containing clean water and wipe dry the external casing only. Place the protective screen in the same solution for 15-20 seconds, rinse and wipe dry.
- Step 4: Holding the transducer in a vertical position so that you can see the face of the sensor, screw the protective nose piece back into place.
- 4. Cleaning the Lightning Protection Data Line Protector



# 4.0 Warranty and Product Return Procedure

Any transducer/transmitter that is less than 2 years old (see DOM) which does not meet the product's specifications and exhibits **no obvious physical damage to the housing, sensor, or cable (cuts),** will be replaced under warranty.

**Units 2-3 years old:** Units that fall within this age group and exhibit no obvious physical damage to the housing, sensor, or cable (cuts), may be replaced at a discounted list price.

**Units greater than 3 years old:** Units that fall within this age group are not replaced under warranty.

#### **Merchandise Return Procedures**

Contact the **Applications Support Group** or the **Customer Service Department** at Pressure Systems if your transducer is not operating properly. Our staff is available for troubleshooting at **(757) 865-1243** or toll free at **1-800-328-3665** during normal working hours, Eastern time. If your transducer or accessory needs to be returned to Pressure Systems, obtain a *Returned Merchandise Authorization* (RMA) from the Customer Service Department prior to shipment. Be prepared to supply the following information when requesting the RMA:

- Part number
- Serial number
- Complete description of problems/symptoms
- Bill To and Ship To address
- Purchase order number (not required for warranty repairs)
- Customer contact and telephone number

The above information, including the RMA number, must be on the customer's shipping documents that accompany the equipment to be repaired. Pressure Systems also requests that the outside of the shipping container be labeled with the RMA number to assist in tracking the repairs. All equipment should be sent to the following address:

ATTN: KPSI TRANSDUCER REPAIR DEPARTMENT (7-digit RMA number) Pressure Systems, Inc. 34 Research Drive Hampton, Virginia 23666

Prior to returning to Pressure Systems, the transducer and cable must be cleaned per instructions provided on the cleaning certificate supplied when the transducer was delivered. The certificate can also be found on Pressure Systems website:

www.PressureSystems.com/cleaning.html

The completed certificate must accompany the transducer when shipped to Pressure Systems. If the transducer has been used in media other than potable water, PSI customer service must be notified at the same time an RMA number is requested. PSI reserves the right to reject any shipment deemed to be unsanitary or environmentally unsafe to handle. If these guidelines are not met, the package will be sent back unopened and at the customer's expense. **Please** 

include the attached vent filter or aneroid bellow with each returned vented gage submersible transducer.

Pressure Systems will return warranty items prepaid via UPS GROUND. If the customer desires another method of return shipment, Pressure Systems will prepay and add the shipping charges to the repair bill.

Incoming freight charges are the customer's responsibility. The customer is also responsible for shipping charges to and from Pressure Systems for all equipment not under warranty.

Once the return is received, it typically takes 5-10 working days for the technician to make a fault determination.

A cable reconnect fee will be charged when the customer requests a different length of cable.

#### **Restocking Policy**

Pressure Systems does allow standard products to be returned for credit in the event it is no longer required, providing the products are in new and unused condition. A restocking fee will be assessed depending on the model type and variety.

A **25% restocking fee** applies to the following models, providing they are vented-gage reference format and [pressure ranges above 3 psig (20 kPa) and below 100 psig (690 kPa)].

27	320	700	710
28	342	705	720
Display Meters - all models			750

A **50% restocking fee** applies to the following models. This also applies to all other models with sealed-gage and absolute pressure formats as well as vented-gage reference formats with [pressure ranges below 3 psig (20 kPa) and above 100 psig (690 kPa)].

30	335
300DS	730
330	735

**NOTE:** Expedite premiums and shipping charges are non-refundable.

Please consult the individual manuals for the Series 500 and Series 550 (waterMONITOR) for the restocking policy.

Pressure Systems, Inc.	KPSI™ Level and Pressure Transducers	User's Manual

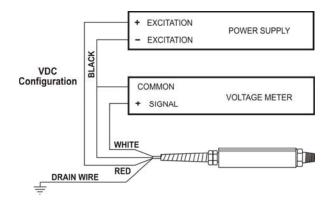
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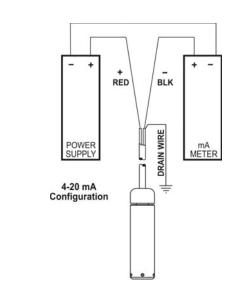
# **Appendix A**

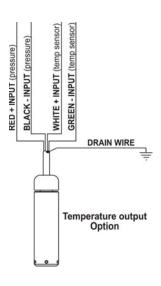
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#### Wiring Diagram VDC, mA, and Temp Output







#### Notes:

These diagrams depict typical installations.
Refer to your power supply and instrumentation
Manufacturer for the specifics of your application.