

Advantage III

Gold Series by Ebtron

Installation Guide

GTL116

“Plug & Play” Transmitter with
Lonworks Network Output

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Models GTC116 and GTM116

Part Number 930-0020

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1 GTL116 TRANSMITTER INSTALLATION

The GTL116 transmitter is designed for use in an environment between -20° F to 120° F (-28.8° C to 48.8° C) where it will not be exposed to rain or snow. Install transmitter upright and in a field accessible location. The enclosure accepts 1/2 in. (12.7 mm) electrical fittings for signal and power wiring at both sides at the top of the enclosure.

Locate the transmitter so that the connecting cables from all of the sensor probes will reach the receptacles on the bottom of the transmitter enclosure.

- ⚠ In locations exposed to direct rain and/or snow, the transmitter must be enclosed in a NEMA4 enclosure.
- ⚠ Leave unobstructed space of at least 9 in. (228.6 mm) above, 2 in. (50.8 mm) to each side and 3.5 in. (88.9 mm) below the transmitter to allow for cover removal, sensor connections and heat dissipation.
- ⚠ Locate the transmitter in a location that can be reached by all connecting cables from the sensor probes.
- ⚠ Do not drill into the transmitter enclosure since metal shavings could damage the electronics.

1.1 GTL116 Mechanical Dimensions

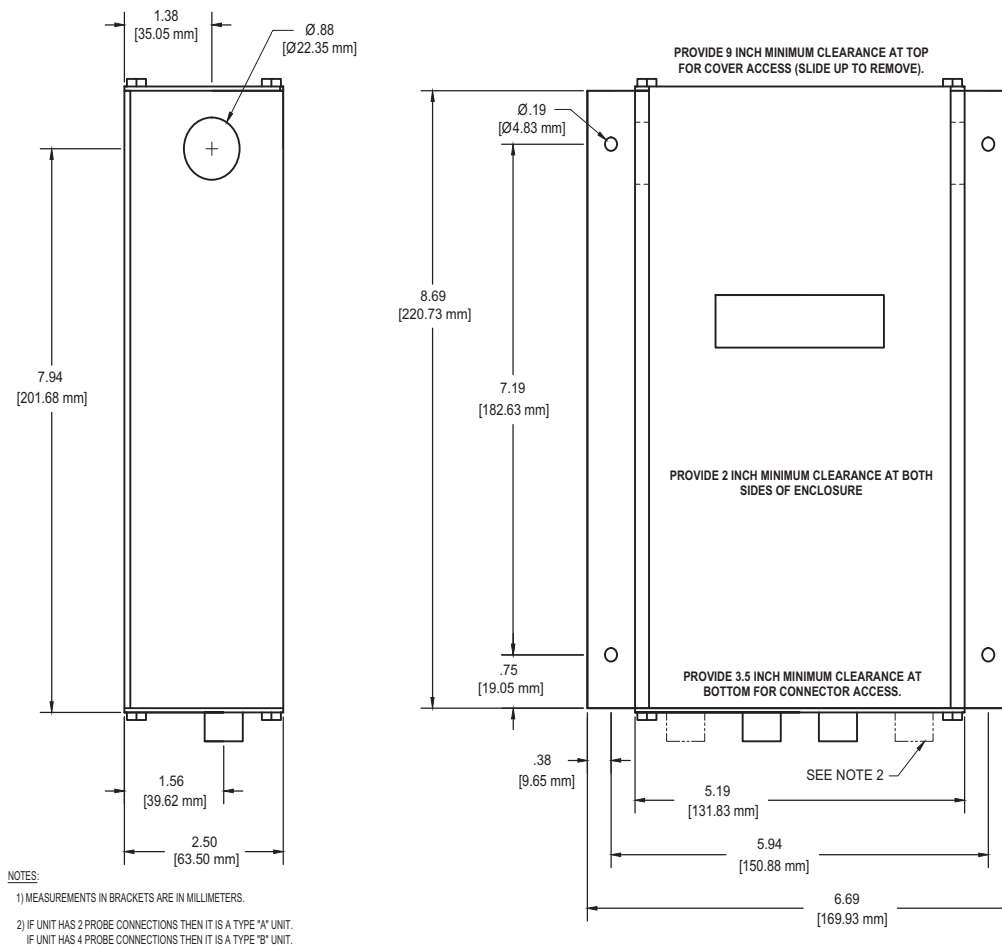


Figure 1. GTL116 Mechanical Dimensions

2 GTL116 TRANSMITTER INTERIOR VIEW/FEATURES

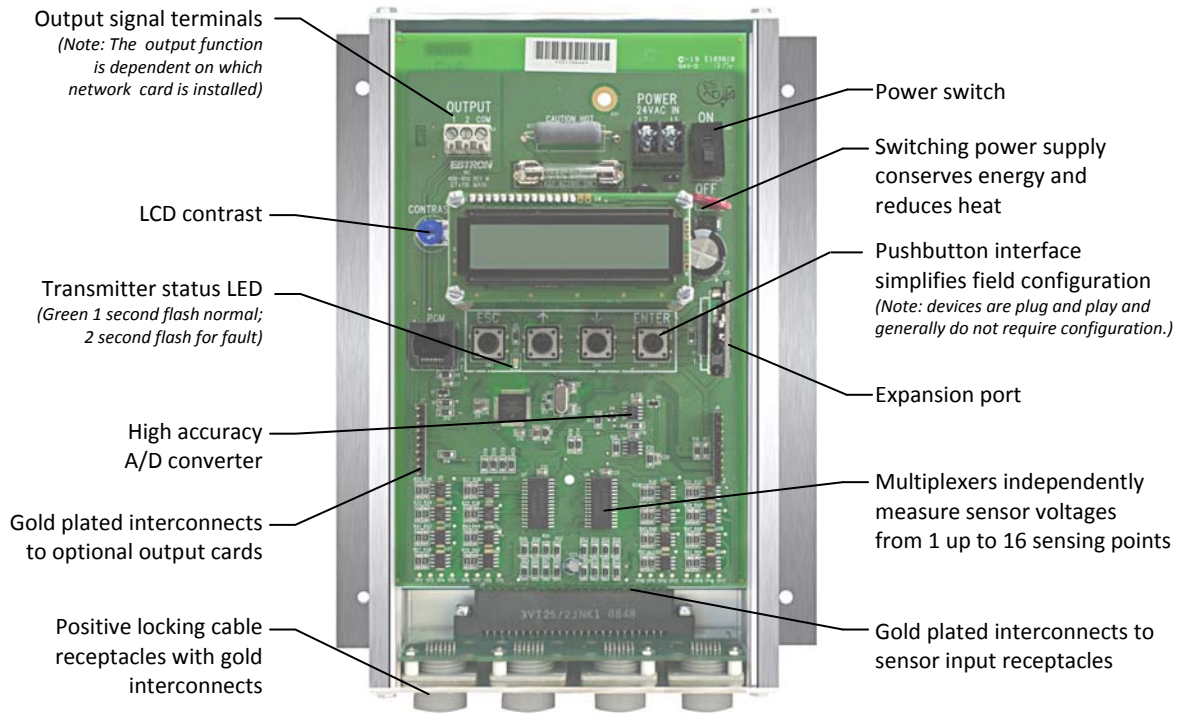


Figure 2. GTL116 Transmitter Interior View/Features

3 GTL116 TRANSMITTER POWER AND PROBE CONNECTIONS

3.1 Power Transformer Selection


Select a 24 VAC transformer based on the maximum power requirements indicated on the transmitter label (20 VA) or from the table below. The operating supply voltage (transmitter power “ON” with all sensor probes connected) should not be less than 22.8 VAC or greater than 26.4 VAC.

Table 1. GTL116 Power Transformer Selection Guide

Total Sensors	Minimum VA Req.	Total Sensors	Minimum VA Req.	Total Sensors	Minimum VA Req.	Total Sensors	Minimum VA Req.
1	12	5	14	9	17	13	19
2	13	6	15	10	17	14	19
3	13	7	15	11	18	15	20
4	14	8	16	12	18	16	20

3.2 Connecting Power to the Transmitter

Connect 24 VAC power to the large, two position power input terminal labeled “POWER” on the upper right hand side of the main circuit board (Figure 3). Since the output signals are isolated from the power supply, it is not necessary to provide an isolated (secondary not grounded) power source.

 Multiple GTL116 transmitters wired to a single transformer must be wired “in-phase” (L1 to L1, L2 to L2).

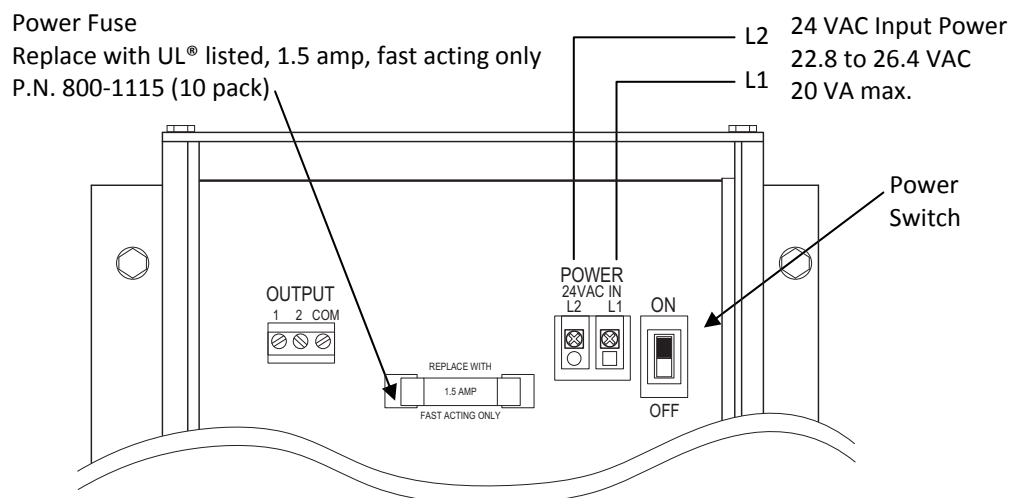






Figure 3. Connecting Power to the Transmitter

3.3 Connecting Sensor Probes to the Transmitter

After installing the sensor probes and transmitter, connect each of the sensor probe cable plugs to the circular receptacles located at the bottom of the GTL116 transmitter enclosure. Probes are “Plug and Play” and do not have to be connected to a specific receptacle on the transmitter unless traverse data is desired (see note below). Transmitters accept only GP1 and GB1 sensors.

-  Provide a “drip loop” at the transmitter if there will be the potential for water runoff or condensation along the sensor probe cable(s).
-  Sensor probe cable plugs are “keyed” as shown below. Line up plug with receptacle and push straight on to receptacle.
-  DO NOT TWIST. Squeeze cable plug “ribs” towards receptacle when removing. Forcing the cable plug in or out of the receptacle will damage the connectors and void warranty.
-  When traverse data is desired (especially when using the EB-Link Reader), probes should be installed and connected to the transmitter using the mounting convention specified in the separate GP1/GB1 sensor probe Installation Guide. Proper installation simplifies sensor location decoding during data analysis.

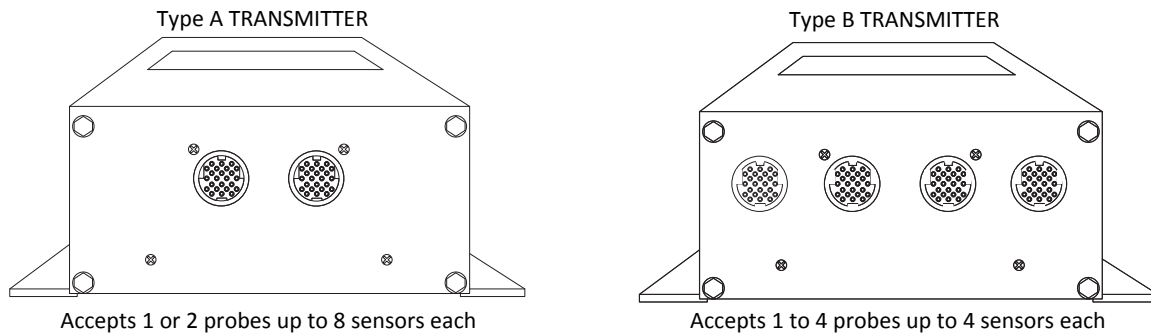
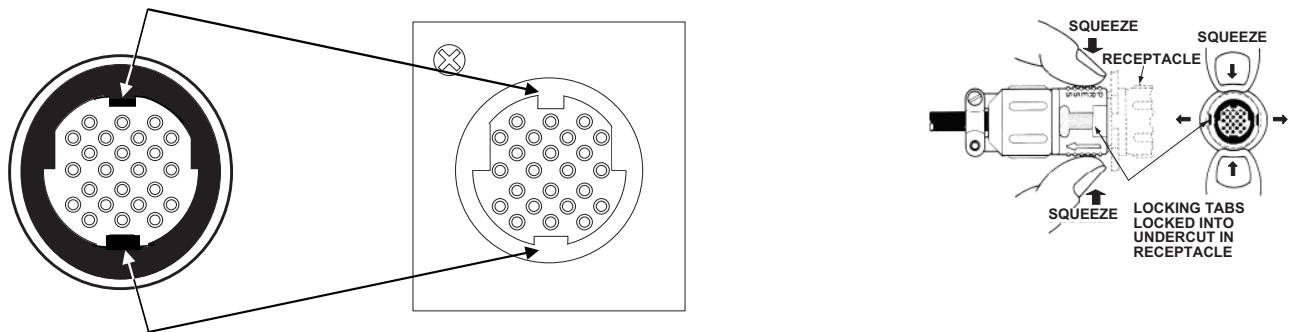


Figure 4. Type A and Type B Transmitter Connector Panel Detail



Squeeze and then pull to remove
DO NOT TWIST!

Figure 5. Connector Detail

4 GTL116 LONWORKS NETWORK CONNECTIONS

This section contains network output wiring instructions for the GTL116 transmitter with Lonworks output.

4.1 GTL116 - LONWORKS NETWORK WIRING CONNECTIONS

To wire the output signal, slide the cover plate up and off of the enclosure. Ensure that the power switch is in the "OFF" position. Connect the transmitter output to the LonWorks bus in a "daisy-chain" configuration, using the OUTPUT terminals as shown in Figure 6. Use shielded twisted pair cable.

OUTPUT TERMINAL	SIGNAL DESCRIPTION
1	NET +
2	NET -
(NOT USED: COMMON)	(NOT USED)

The shield is typically grounded at one end of the bus, and is therefore not connected to the transmitter terminals.

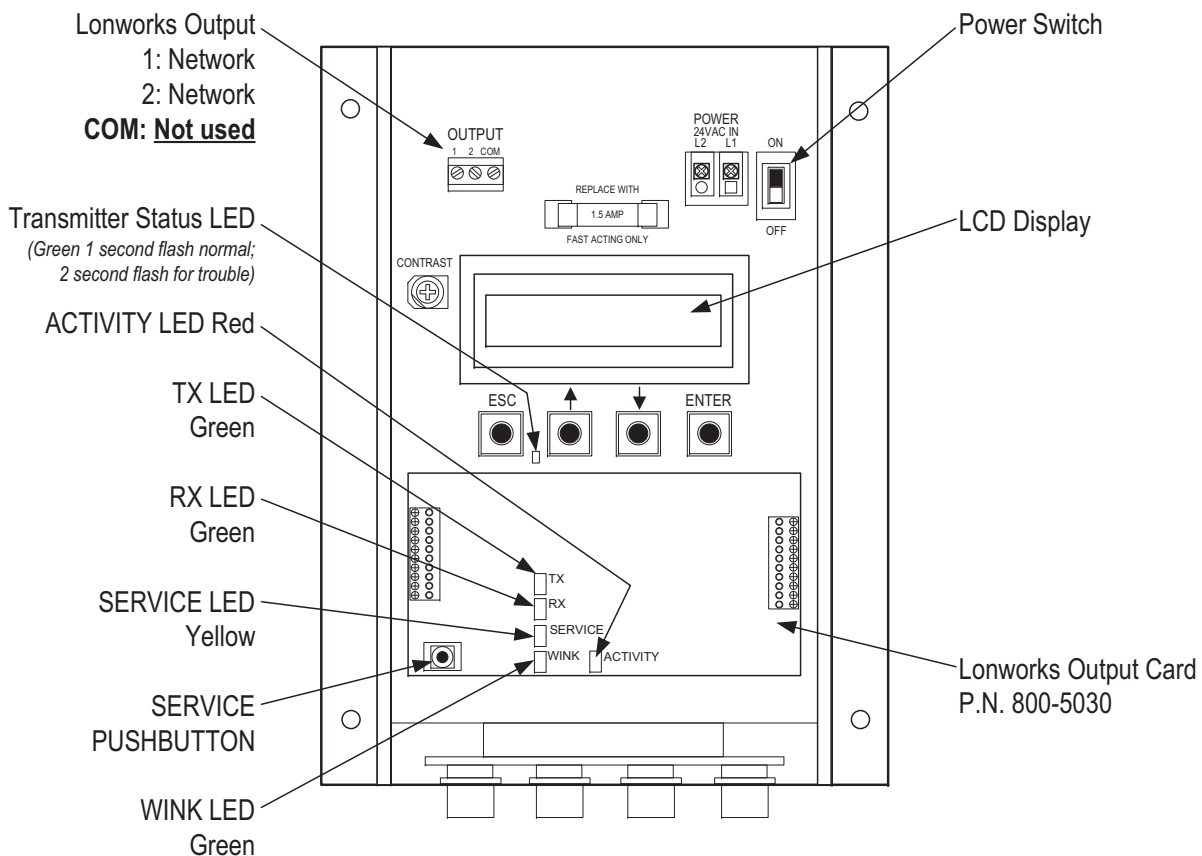


Figure 6. GTL116 LonWorks Transmitter Interior Detail

a measurable difference!

4.2 GTL116 - Transmitter Setup for LonWorks Operation

The GTL116 includes a full featured LonWorks compatible interface. The GTL116 may be pre-configured using the EBTRON_116.XIF file (available for download at http://www.ebtron.com/downloads/EBTRON_116.XIF) or can be configured at installation via direct LonWorks parameter upload from the GTL116 transmitter. A "Service" push-button and indicator LED are provided for standard installation. A "Wink" LED is provided for easy device identification. An "Activity" LED and separate transmit and receive "TX" and "RX" indicators provide visual indication of transmitter and communication status. The "Activity" LED normally flashes on for 1 second, off for 1 second when the card is commissioned and online, and remains illuminated constantly if there is an error.

4.3 GTL116 - Lonworks Interface

4.3.1 GTL116 - Introduction

The Ebtron LonWorks interface adapter provides an output for connection to an Echelon LonWorks compatible network. Two basic function blocks are provided. These are a node object and a gtx116 function block. The node object is used for overhead activities on the LonWorks bus and is of little interest to the end user. The gtx116 function block contains a set of network variables and configuration properties that allow the end user to monitor various parameters related to airflow, pressure, and temperature provided by the transmitter.

Tables 2 through 8 describe each of the variables used and the configuration properties for each. There are configuration properties that apply to multiple objects, but may not be listed directly under them when viewed on the network. Check the "applies to" tag in the description for the configuration property in the following sections.

NOTE

Units shown are default values and, depending on software used, may be set automatically by location.

4.3.2 GTL116 - Velocity and Flow Variables Configuration

This section details the air flow and air velocity variables and how the configuration properties relate to them.

4.3.3 GTL116 - Velocity and Flow Variables

Table 2. GTL116 LonWorks Node Velocity and Flow Variables

Air Flow Sensor Objects					
Variable Name	Variable Type	Measurement	Type Category	Type Resolution	Units
nvoAirVel	SNVT_speed_mil	Linear Velocity	Unsigned Long	0.001	Meters/second
nvoAirFlow	SNVT_flow	Flow Volume	Unsigned Long	1	Liters/sec
nvoAirFlowFl	SNVT_flow_f	Flow Volume	Floating Point	n/a	Liters/sec



For the "nvoAirFlow" and "nvoAirFlowFl" variables to be meaningful, the ductArea configuration property must be set.

nvoAirVel (SNVT_speed_mil - Air Velocity)

This variable provides simple linear airflow in meters/second.

nvoAirFlow (SNVT_flow - Airflow)

This variable provides volumetric airflow in liters/sec. For this variable to be meaningful, the ductArea configuration property must be set.

nvoAirFlowFl (SNVT_flow_f - Airflow Float)

This variable provides volumetric airflow in liters/sec. For this variable to be meaningful the ductArea configuration property must be set.

4.3.4 GTL116 - Velocity and Flow Configuration Properties

Table 3. GTL116 LonWorks Node Velocity and Flow Configuration Properties

Air Flow Sensor Configuration Properties					
<i>nvoAirVel</i>	SCPTmaxSendTime	Time	Signed Long	0.1	Seconds
<i>nvoAirVel</i>	SCPTminSendTime	Time	Signed Long	0.1	Seconds
<i>nvoAirVel</i>	SCPTminDelta	Linear Velocity	Unsigned Long	0.001	Meters/second
<i>nvoAirFlow</i>	SCPTductArea	Area	Unsigned Long	0.0002	Square Meters

nvoAirVel (SCPTmaxSendTime - Maximum Time Between Updates)

This configuration property sets the maximum time to elapse between updates to the network for velocity and flow to occur.

nvoAirVel (SCPTminSendTime - Minimum Time Before Updates)

This configuration property sets the minimum time to elapse before an update to the network for velocity and flow may be sent. This configuration property takes priority over maxSendTime and sndDelta.

nvoAirVel (SCPTsndDelta - Minimum Change for Update)

This configuration property sets the minimum change in velocity that will cause an update of flow and velocity to the network. The change is only checked for in velocity, and when the minimum is reached updates will occur for *nvoVel*, *nvoFlow*, and *nvoFlowFI*.

nvoAirFlow (SCPTductArea - Duct Area for Air Flow Calculation)

This configuration property sets the duct area to be used in flow calculations. Note that this variable must be set to a non-zero value to get flow information.

4.3.5 GTL116 - Area Input Variable

This section details the network input variable area.

Table 4. GTL116 LonWorks Area Input Variable

Area Object					
Variable Name	Variable Type	Measurement	Type Category	Type Resolution	Units
<i>nviArea</i>	SNVT_area	Area	Unsigned Long	0.0002	Square Meters

nviArea (SNVT_area – Duct Area for Air Flow Calculation)

This network input sets the duct area to be used in flow calculations. This variable is essentially a copy of *nvoAirFlow:SCPTductArea*; only one of these inputs needs to be configured before using *nvoAirFlow* or *nvoAirFlowFI*.

a measurable difference!

4.3.6 GTL116 - Pressure Variables and Configuration

This section details the pressure variables and how the configuration properties relate to them.

Table 5. GTL116 LonWorks Node Pressure Variables

Dynamic Pressure Sensor Object					
Variable Name	SNVT	Measurement	Type Category	Type Resolution	Units
nvoPrecisePres	SNVT_press_p	Pressure	Signed Long	0.00001	PA
nvoFloatPres	SNVT_press_f	Pressure	Floating Point	n/a	PA

nvoPrecisePres (SNVT_press_p - Airflow Pressure)

This variable provides pressure in Pascal. For this variable to be meaningful a bleed sensor must be attached to the transmitter.

nvoFloatPres (SNVT_press_f - Airflow Pressure Float)

This variable provides pressure in Pascal. For this variable to be meaningful a bleed sensor must be attached to the transmitter.

4.3.7 GTL116 - Pressure Configuration Properties

Table 6. GTL116 LonWorks Node Pressure Configuration

Dynamic Pressure Sensor Configuration Properties					
nvoPrecisePres	SCPTmaxSendTime	Time	Signed Long	0.1	Seconds
nvoPrecisePres	SCPTminSendTime	Time	Signed Long	0.1	Seconds
nvoPrecisePres	SCPTsndDelta	Pressure	Signed Long	0.0001	PA

nvoPrecisePres (SCPTmaxSendTime - Maximum Time Between Updates)

This configuration property sets the maximum time to elapse between updates to the network for pressure to occur.

nvoPrecisePres (SCPTminSendTime - Minimum Time Before Updates)

This configuration property sets the minimum time to elapse before an update to the network for pressure may be sent. This configuration property takes priority over maxSendTime and sndDelta.

nvoPrecisePres (SCPTsndDelta - Minimum Change for Update)

This configuration property sets the minimum change in pressure that will cause an update for pressure to the network. When this change is met both nvoPrecisePres and nvoFloatPres will be updated on the network.

4.3.8 GTL116 - Temperature Variables and Configuration Properties

This section details the temperature variable and how the configuration properties that relate to it.

Table 7. GTL116 LonWorks Node Temperature Variable

Temperature Sensor Object					
Variable Name	SNVT	Measurement	Type Category	Type Resolution	Units
nvoTemp	SNVT_temp_p	Temperature	Signed Long	0.01	Degrees C

nvoTemp (SNVT_temp_p - Temperature Variable)

This network variable provides temperature in degrees Celsius.

4.3.9 GTL116 - Temperature Configuration Properties

Table 8. GTL116 LonWorks Node Temperature Configuration

Temperature Sensor Configuration Properties					
<i>nvoTemp</i>	SCPTmaxSendTime	Time	Signed Long	0.1	Seconds
<i>nvoTemp</i>	SCPTminDeltaTemp	Temperature	Signed Long	0.001	Degrees C
<i>nvoTemp</i>	SCPTminSendTime	Time	Signed Long	0.01	Seconds

nvoTemp (SCPTmaxSendTime - Maximum Time Between Updates)

This configuration property sets the maximum time to elapse between updates to the network for temperature to occur.

nvoTemp (SCPTminDeltaTemp - Minimum Change for Update)

This configuration property sets the minimum change in temperature that will cause an update of *nvoTemp* to the network.

nvoTemp (SCPTminSendTime - Minimum Time Before Updates)

This configuration property sets the minimum time to elapse before an update to the network for temperature may be sent. This configuration property takes priority over *maxSendTime* and *minDeltaTemp*.

4.4 GTL116 - Default Delta Values

The default Delta values determine when updates are sent from the transmitter to the network. The factory default Delta values are set to a large enough value to prevent any undesired messages from being sent to the network. Refer to the preceding paragraphs for description and configuration of the Delta values.

5 GTL116 TRANSMITTER START-UP, INITIALIZATION AND SETUP MENUS

To ensure a successful start-up, verify that the airflow measuring station sensor probes and transmitter are installed in accordance with *EBTRON* guidelines.



Check the physical installation, power connections and model specific signal wiring prior to turning the power switch to the “ON” position.

Move the power switch to the “ON” position. The transmitter executes a complete self-check each time the power is turned on that takes 10 seconds to complete.

The GTL116 must be properly configured for the LonWorks network. Review section 4.6 of this document for detail, or contact *EBTRON* Customer Service, toll free, at 800-232-8766.

5.1 Changing the System of Units - IP or SI Units

The GTL116 transmitter is provided with the system of units set to IP. To change to SI units, simultaneously press and release the “ENT” and “ESC” buttons during normal operation. “IP/SI UNITS” will be indicated on the LCD display. Refer to Appendix A SYSTEM OF UNITS MENU for details on the System of Units menu. Note that Setup Menu items are shown in IP System Of Units. When SI System of Units is selected, the units of measure abbreviations used in the menus is shown in Table 9.

Table 9. Standard “IP” and “SI” Menu Units Abbreviations

“IP” System of Units	Description	“SI” System of Units	Description
FPM	Feet per minute	MPS	Meters per second
CFM	Cubic feet per minute	LPS	Liters per second
SQF	Square feet	SQM	Square meters
F	Fahrenheit	C	Celsius

5.2 GTL116 Transmitter Calibration

The GTL116 uses high quality industrial grade components and is designed for years of trouble-free operation. Periodic recalibration of the transmitter is neither required or recommended. Transmitter field calibration verifiers are available for purchase from *EBTRON* for installations requiring periodic validation of instrumentation. Contact *EBTRON* for more information.

5.3 GTL116 LCD Display Notifications

Following a brief initialization at power up, the LCD display automatically displays airflow and temperature with units of measurement in all upper case (caps) characters. The display provides additional information on system status and alarm conditions. Refer to the ALARM FEATURES section of this manual for additional detail on Alarm and Trouble Error code indications.

5.4 Factory Default Menu Settings for GP1 Sensor Probes

The GTL116 transmitter is “plug and play” and does not require setup unless a network option is selected that requires configuration. Table 10 shows the factory default settings for all compatible sensor probes. To change the Factory Default Settings, see: CHANGING FACTORY DEFAULT SETUP MENU SETTINGS.

Table 10. Factory Default Menu Settings

Display	Description	I-P	S.I.
AIRFLOW=	Airflow measurement method, Actual or Standard.	ACT	ACT
*LCDU/M=	Airflow units of measure	ACFM	ALPS
*AREA=	Free area where station is located (required for volumetric measurement)	0.00 sq.ft. (see note)	0.000 sq.meters (see note)
*LLIMIT=	Low limit cutoff	0 AFPM	0 AMPS
*FLOW ADJ=	Offset-Gain On/Off	Off	Off
*GAIN=	Gain factor	1.000	1.000
*OFF=	Offset factor	0.000	0.000
*TEMP METH=	Temperature Averaging	Weighted Avg.	Weighted Avg.
*LCD INTG=	Number of flow calculations to be averaged for LCD display.	100	100
*EB-LK INT=	Number of flow calculations to be averaged for EB-Link readings.	300	300
*ALT=	Altitude for flow correction relative to mean sea level (0 ft).	0 ft	0 m
*SETPNT=	Alarm setpoint value. Operates in conjunction with TOL=value.	0	0
*TOL=	Alarm range tolerance value. This setting establishes the alarm range relative to the SETPNT= value.	10%	10%
*DELAY=	Time that the alarm condition must exist before alarm output is activated.	2 minutes	2 minutes
*ZERO OFF =	Set to YES to inhibit LO alarm condition when flow reading is below LLIMIT= setting. Set to NO to disable this feature.	NO	NO
*RESET =	Set to AUTO to have alarm self-clear when alarm condition no longer exists. Set to MANUAL to require manual reset of alarm.	AUTO	AUTO

Note: For GP1 probes, area is stored in one-wire, but can be changed.

5.5 GTL116 Changing Factory Default Setup Menu Settings

5.5.1 Setup Menu Options

The GTL116 Transmitter is setup and tested at the factory to be fully operational when sensor probes are connected and power is applied (set the power switch to the “ON” position). Factory settings can easily be changed using the SETUP MENU by simultaneously pressing and releasing the “UP” and “DOWN” buttons while the transmitter is in its normal operating mode. Appendix A details the SETUP menus. Navigate through the SETUP menus to make changes to the transmitter configuration. The settings take effect immediately. The following are common field modifications to the factory default settings.

5.5.2 Selecting Actual and Standard Output Measurement Type

The transmitter is set from the factory to provide actual airflow measurement units (displayed as “ACFM” and “AFPM”). In this mode, airflow measurements are calculated for actual airflow conditions. If using actual airflow conditions, corrections for altitude are entered through the ALT= setting in the Setup menu. If desired, the output can be set to provide standard airflow measurement units (displayed as “SCFM” and “SFPM) which provides measurements that are corrected to standard conditions.

5.5.3 Changing the LCD Display from Volumetric Flow CFM to Velocity FPM

The GTL116 transmitter is shipped from the factory to indicate volumetric flow. To display velocity in FPM, enter the SETUP menu and in the DISPLAY submenu, change the “*LCD UM=ACFM” to “*LCD UM=AFPM”.

5.5.4 Locking the Configuration Settings

The GTL116 transmitter configuration settings can be locked at one of three security levels within the SECURITY submenu using the LOCK SEC= item.

When LOW security level is selected (LOCK SEC=LOW) the last 4 digits of the board serial number are automatically assigned as the lock code. To see the board serial number, navigate to DIAGNOSTICS menu in SERIAL NUMBERS item.

When the MED security level is selected (LOCK SEC=MED) the user enters a security code. In the event that this code is lost/misplaced, EBTRON can provide a key that is unique to the transmitter to unlock it. Contact EBTRON customer service for this code.

When the HIGH security level is selected (LOCK SEC=HIGH) the user enters a security code. In the event that this code is lost/misplaced, the transmitter must be returned to the factory in order to unlock it.



When LOCK SEC=HIGH is selected, the user defined setting can only be changed after entering the user defined code. STORE THE LOCK CODE IN A SAFE LOCATION! For security reasons, the HIGH level lock code can only be reset by returning the transmitter to the factory.

5.6 GTL116 - Alarm Features

5.6.1 Alarm Indications

Table 11 details the alarm types and LCD indications available from the GTL116. User can select either or both of the two Average Alarms and the Trouble Alarm in the ALARM submenu.

5.6.2 Low Alarm - “LO ALRM= ON”

The Low Alarm is activated when the average airflow falls to a defined level below the SETPNT= value. The defined level is equal to the SETPNT= value minus the calculated value of (TOL= value * SETPNT= value). Once active, the alarm can be cleared when the average airflow rises above the set point minus calculated tolerance value.

5.6.3 High Alarm - “HI ALRM= ON”

The High Alarm is activated when the average airflow rises above a defined level above the SETPNT= value. The defined level is equal to the SETPNT= value plus the calculated value of (TOL= value * SETPNT= value). Once active, the alarm can be cleared when the average airflow falls below set point plus calculated tolerance value.

5.6.4 LCD Trouble Alarm - “LCD TRBL=ON”

The transmitter Trouble alarm is selected in the DISPLAY submenu (LCD TRBL=ON) and provides trouble codes useful for isolating setup issues or problems within the transmitter or sensors. The transmitter LCD will indicate TROUBLE! The Diagnostic submenu can be engaged for the error code and a brief description of the trouble. Contact EBTRON customer service for information on troubleshooting using the Trouble error codes.

Table 11. GTL116 Alarm Types and Notifications

ALARM OUTPUT TYPE	LOCAL LCD DISPLAY OF ALARM TYPE AND NOTIFICATION
User can select either of the two Average Alarms along with the Trouble Alarm:	
LOW ALARM (Average Alarm)	Display alternates between **LOW ALARM** and actual reading for 2 seconds each.
HIGH ALARM (Average Alarm)	Display alternates between **HIGH ALARM** and actual reading for 2 seconds each.
TROUBLE ! (Trouble Alarm)	Display indicates TROUBLE ! (Refer to DIAGNOSTIC menu to obtain a brief description of the error and any other alarms).

5.7 Viewing Sensor Data

5.7.1 Viewing Sensor Data on the Local LCD Display

Airflow and temperature can be displayed on the local LCD display by entering the Diagnostic Menu. Simultaneously depress the up ↑ and down ↓ arrows to enter the GTL116 SETUP menu, and then navigate to the Diagnostic submenu.

5.7.2 Viewing Sensor Data via EB-Link Reader

Airflow and temperature of individual sensors can be downloaded directly to an EB-Link Reader if the infra-red *EB-Link* option has been installed. Refer to the following Sensor Addressing and Probe Positioning paragraph for the suggested probe installation configuration.

5.7.3 Sensor Addressing and Probe Positioning

Sensors are automatically addressed after power is applied to the transmitter as follows:

The probe connected to the left most connector, C1, is defined as probe 1. The sensor opposite the cable end of the probe is defined as sensor 1 when viewing individual sensor data. Refer to Figure 7 below for additional detail.

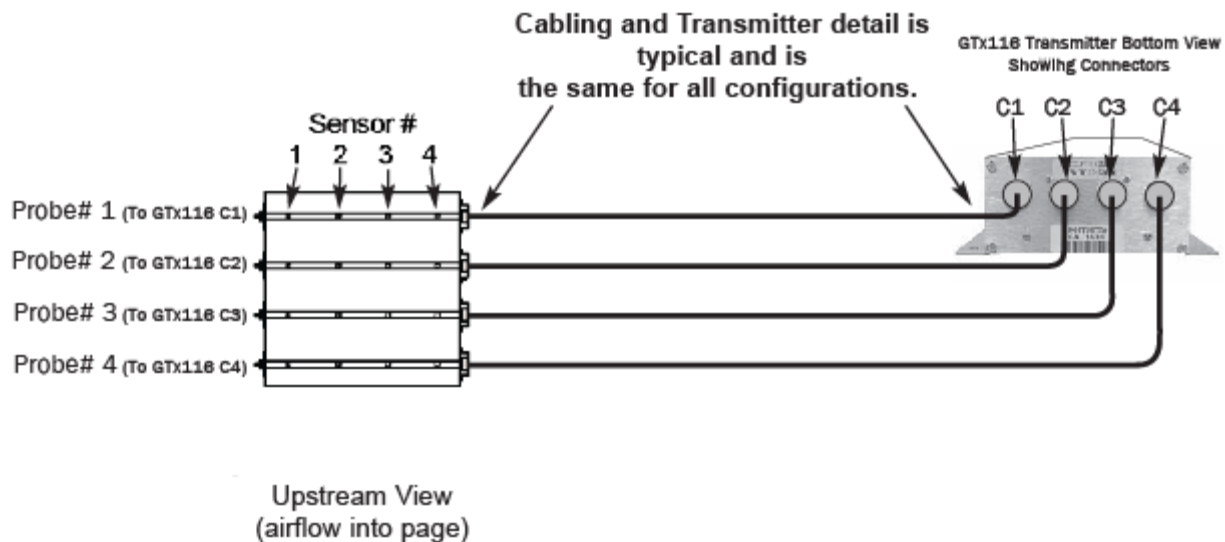


Figure 7. Sensor Addressing and Probe Positioning Detail

Note that if only average data is desired, the mounting position of the probes is not critical. When a probe is disconnected and then plugged in to a different port, the transmitter will re-discover it within 15 seconds and make any necessary addressing adjustments.

To standardize installation and decoding of data, particularly when using the EB-Link Reader product, *EBTRON* recommends a left to right (or top to bottom in vertical applications) sensor probe mounting convention as detailed in the separate sensor probe installation instructions.

6 SETUP MENUS

Appendix A details the various setup menus and submenus.

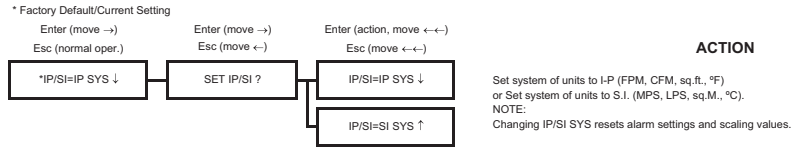
7 WIRING DIAGRAM

Appendix B is the wiring diagram for the GTL116 transmitter.

APPENDIX A - ADVANTAGE 3 - BLEED SENSOR SETUP MENUS

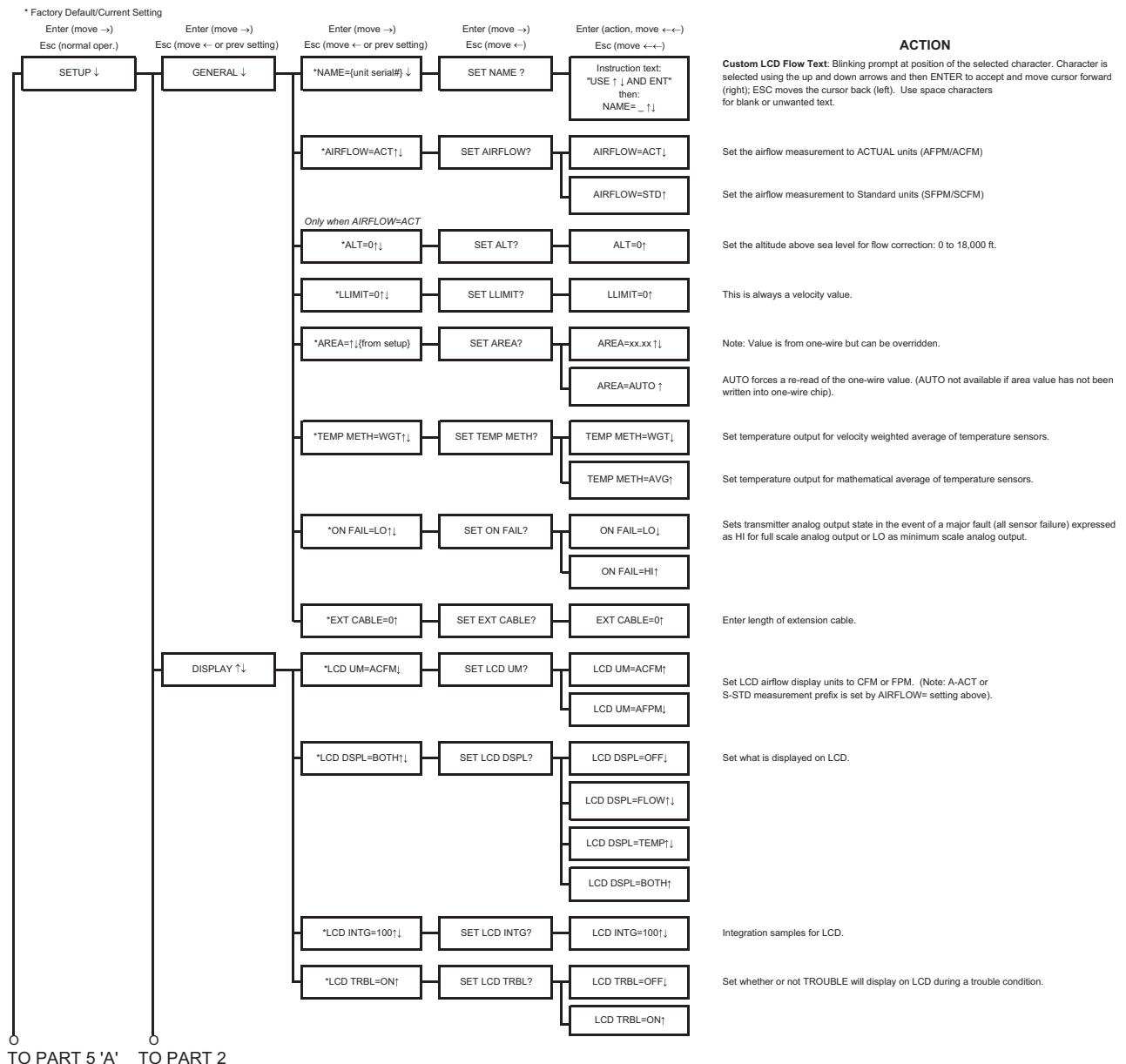
SYSTEM OF UNITS MENU

Simultaneously depress/release ENTER + ESC keys during normal operation to select

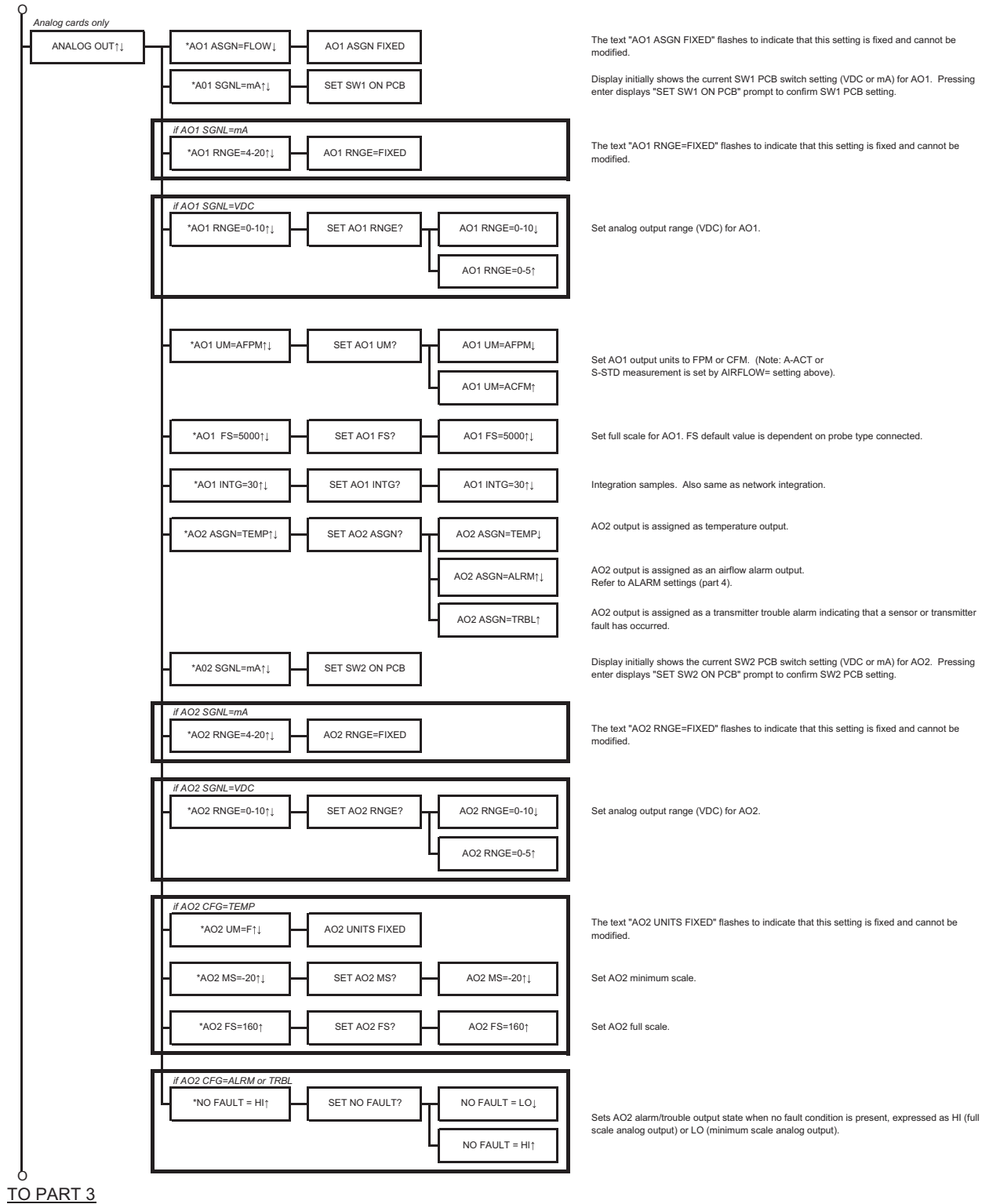


SETUP MENU

Simultaneously depress/release ↑ + ↓ keys during normal operation to select

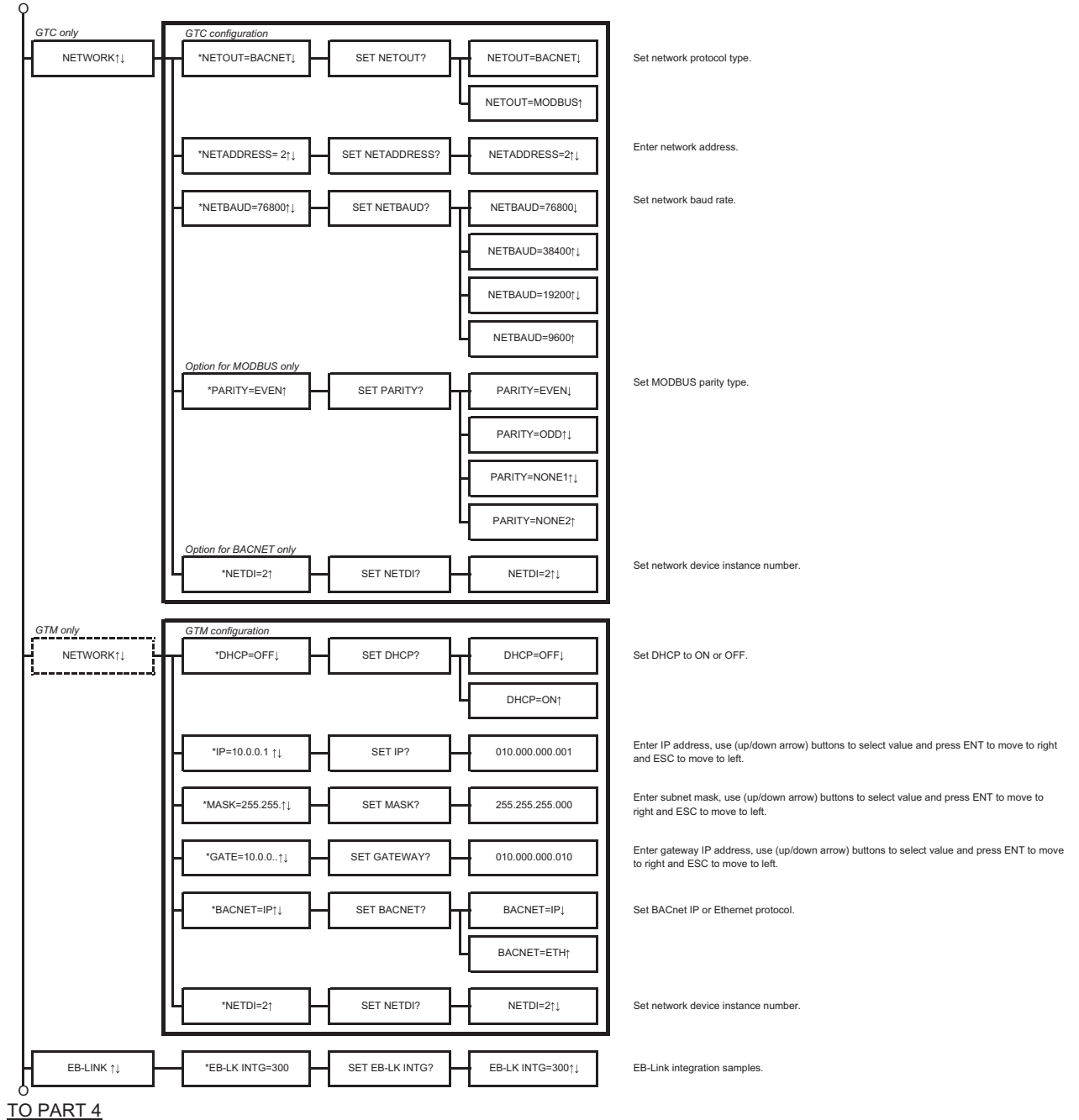


FROM PART 1

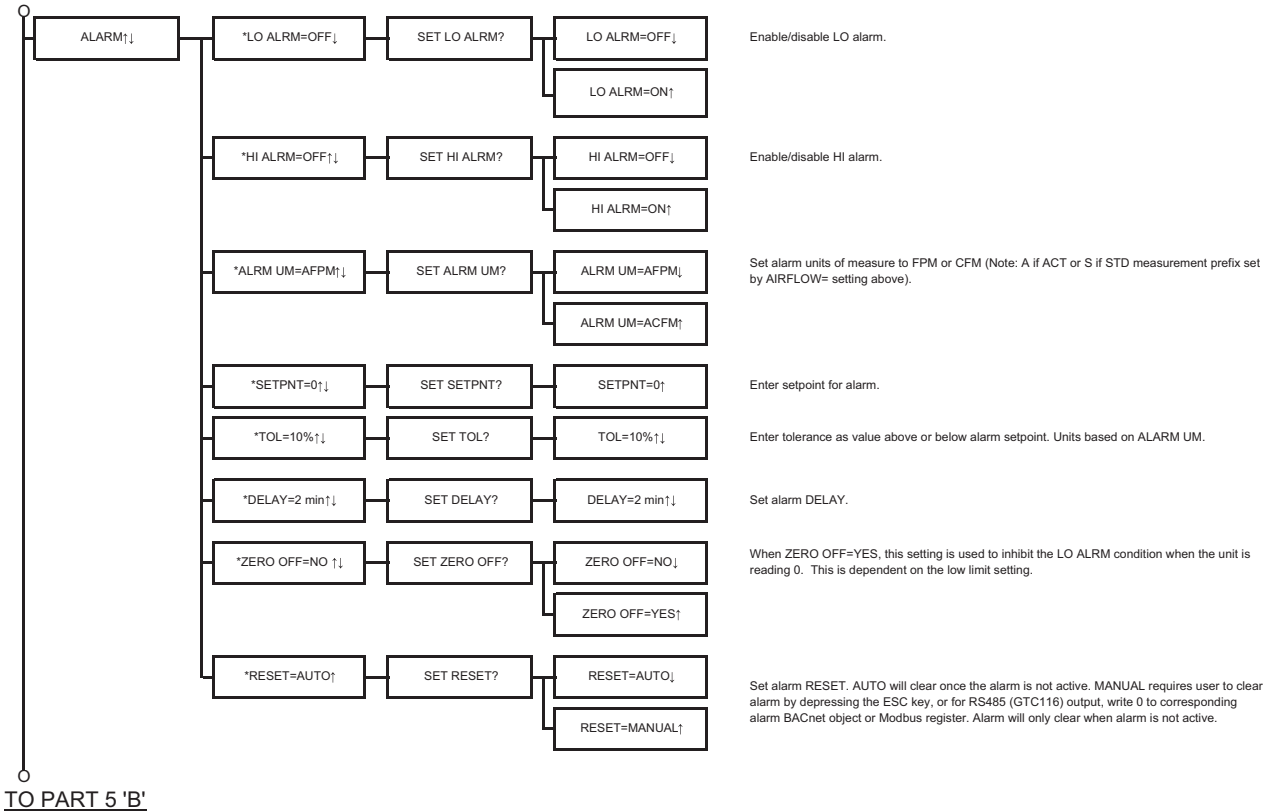


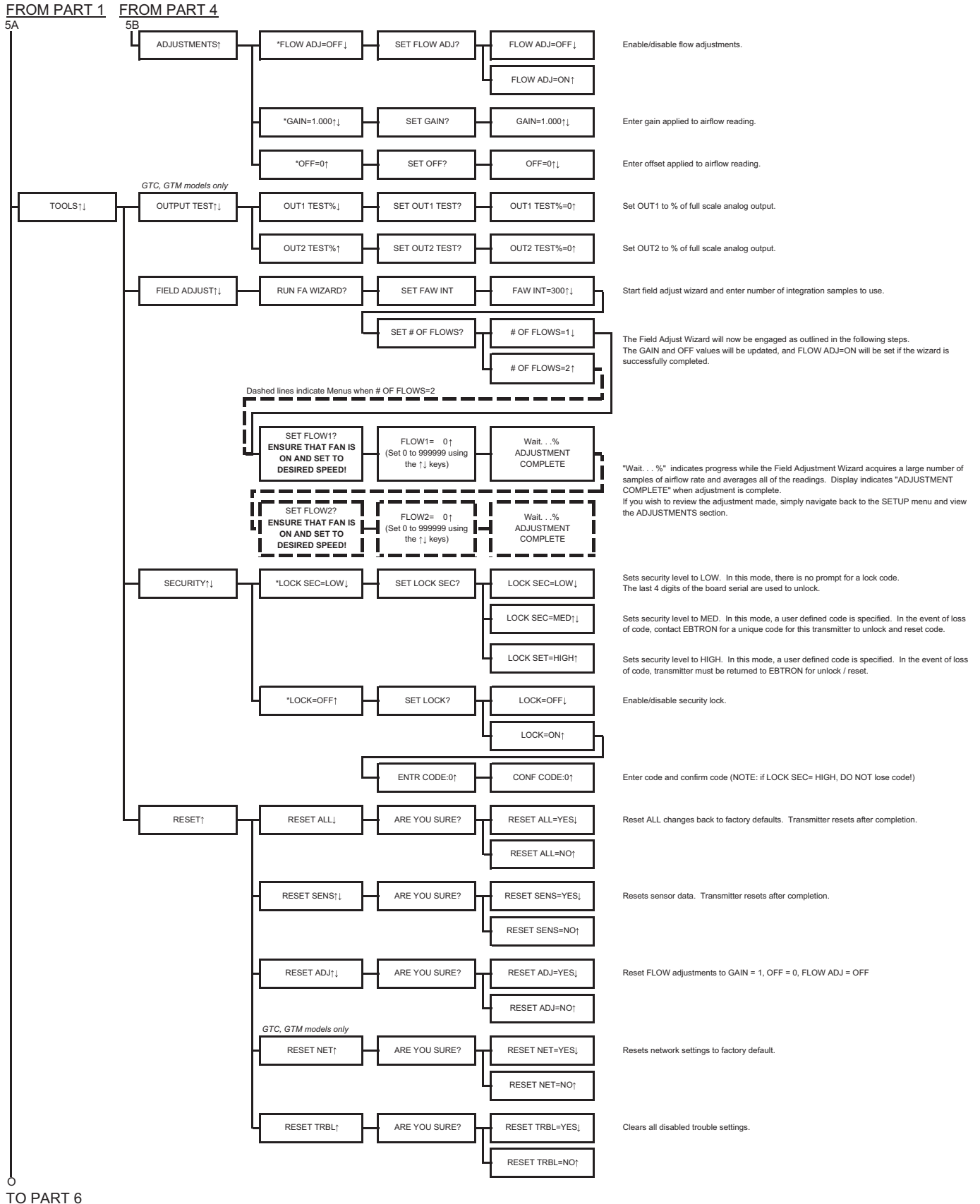
TO PART 3

FROM PART 2

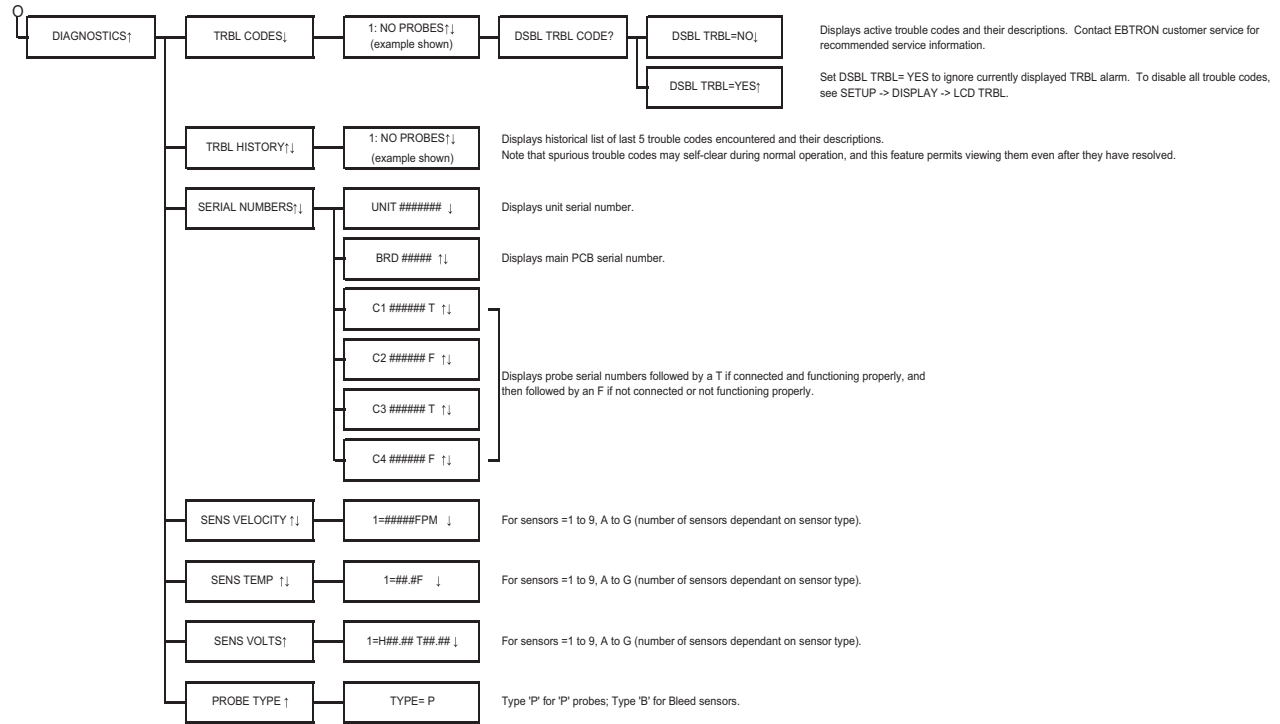


FROM PART 3

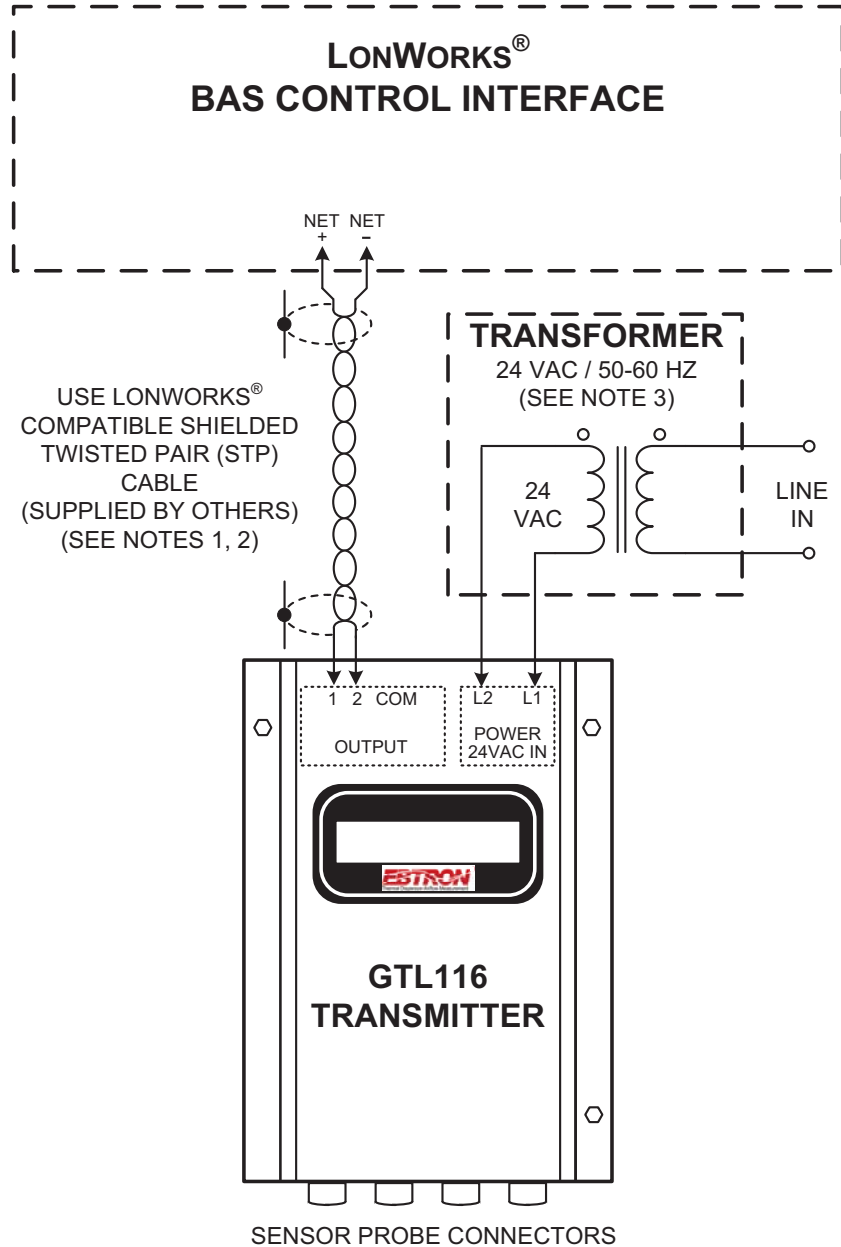




FROM PART 5



APPENDIX B - GTL116 WIRING DIAGRAM



NOTES:

- 1: REFER TO *LonWorks® FTT-10A Free Topology Transceiver User's Guide* AVAILABLE AT www.echelon.com FOR LONWORKS® NETWORK WIRING SPECIFICATIONS AND TERMINATION REQUIREMENTS.
2. GTL116 CONNECTIONS AT TERMINALS 1 AND 2 (NET + and NET -) ARE NOT POLARITY SENSITIVE, AND THE COM CONNECTION IS NOT USED.
3. ON MULTIPLE GTx116 TRANSMITTER INSTALLATIONS WITH A COMMON 24VAC SOURCE, WIRE 24 VAC CONNECTIONS IN-PHASE TO THE SAME TERMINALS ON ALL TRANSMITTERS (e.g.: L1 to L1, L2 to L2).

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