9325

ANALOG OUTPUT MODULE

Technical Manual

INTRODUCTION

This publication is provided solely as a guide for individuals who have received METTLER TOLEDO Technical Training in servicing the METTLER TOLEDO product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

FCC NOTE

This equipment has been tested and found to comply with the limits of the United States of America FCC rules for a Class A digital device, pursuant to Part 15 of the Communications. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

IMPORTANT!

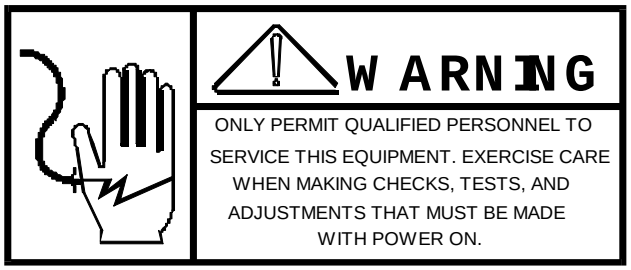
It is most important that the correct part number is used when ordering. Parts orders are machine processed, using only the part number and quantity as shown on the order. Orders are not edited to determine if the part number and description agree.

PRECAUTIONS

- **READ** this manual before operating or servicing this equipment.

- **ALWAYS REMOVE POWER** and wait at least 30 seconds **BEFORE** connecting or disconnecting any internal harnesses. Failure to observe these precautions may result in damage to, or destruction of the equipment.

- **ALWAYS** take proper precautions when handling static sensitive devices.



- **DO NOT** connect or disconnect a load cell scale base to the equipment with power connected or damage will result.

- **SAVE** this manual for future reference.

- **DO NOT** allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

- **ALWAYS DISCONNECT** this equipment from the power source before servicing.

- **CALL** METTLER TOLEDO for parts, information, and service.

CAUTION
DO NOT APPLY POWER TO THE UNIT UNTIL ALL CONNECTIONS HAVE BEEN MADE, ALL JUMPERS HAVE BEEN PROPERLY INSTALLED AND ALL DIP SWITCHES HAVE BEEN PROPERLY SET.

CAUTION
DO NOT SET S3 SWITCHES WITH POWER APPLIED TO THE 9325. DO NOT APPLY POWER TO THE UNIT UNTIL ALL JUMPERS AND SWITCHES HAVE BEEN CONFIGURED.

CONTENTS

1. GENERAL DESCRIPTION

The 9325 Analog Output Module is designed to provide interface between most of the Mettler Toledo Industrial indicators, the M5000, PM, SM, or ID Series and equipment requiring an analog input signal. The Analog Output Module will accept serial data from any of the Mettler Toledo indicators that output a serial data in the TOLEDO® continuous data format with checksum, the Toledo continuous setpoint data format with checksum, the Masstron continuous format, or Mettler continuous output format. The Analog Output Option provides isolated outputs for 4-20mA current loop, 0-5 VDC and 0-10 VDC, The resolution of the Analog Output is 1 part in 10,000. In addition, the module provides a serial output that may be selected to echo the data received, or output data to a printer.

2. SPECIFICATIONS

2.1 POWER

1). Input Voltage
115/230 VAC ± 10% selectable via input wiring. Refer to section 3.3 for voltage selection.

2). Input Frequency
50 / 60 HZ.

3). Power Consumption
10 watts maximum.

2.2 MECHANICAL CONFIGURATION

1). Packaging
The unit is packaged in either a mild steel, stainless steel, cast aluminum wall mount enclosure or a panel mount version. The mild steel or stainless steel enclosure is 12.5" H x 11" W x 3.5" D. The cast aluminum explosion proof enclosure is 15.5"H x 12.25"W x 6.5"D. The panel mount assembly is 10.75" H x 8.88" W x 2.28" D.

2). Terminations

All wiring connections to the PC boards for power, data and signal cables are via terminals strips. A fiber optic receive connector is also mounted on PC Board for fiber optic cable interface. Three CGB (Environmentally Tight) type fittings are provided on the enclosure for cable entry.

2.3 ENVIRONMENTAL

1). Storage Temperature
-50 to 100 °C (-58 to 212 °F).

2). Operation Temperature
0 to 40 °C (32 ° to 104 °F).

3). Humidity Range
10% to 95% relative humidity non-condensing.

2.4 SERIAL INPUT INTERFACE

The unit will automatically recognize the data format and the baud rate for the Toledo, Masstron and Mettler products. The data must conform to the following specifications:

1). Interface Type

RS232, RS422/485, 20 mA current loop and fiber optic; all jumper selectable.

2). Message Format

Accepts serial data in either the Toledo continuous data format with checksum, the Toledo continuous setpoint data format with checksum, the Masstron M5000 continuous data format, or the Mettler PM or SM or ID series Indicator continuous output format.

3). Data Format

1 start bit, 7 data bits, 1 parity bit, and 1 or 2 stop bits. Parity may be even, odd or none.

4). Baud Rate

1200, 2400, 4800 and 9600 for Toledo and Mettler continuous format, 4800 for Masstron M5000 continuous format.

2.5 SERIAL OUTPUT INTERFACE

The serial output port maybe configured to output data to a printer, or it may be configured to echo the data received to provide an interface to additional accessories. It cannot be configured for both simultaneously.

2.6 PRINTER OUTPUT

1). Interface Type

RS232, RS422/485 and 20 mA current loop.

2). Message Format

Selectable to output displayed weight only, single line G-T-N, or three line G-T-N. Output is upon demand and is triggered by the indicator PRINT button. This printer output is not available when interfaced using the Masstron continuous data format, or the Mettler continuous format.

3). Data Format

1 start bit, 7 data bits, 1 even parity bit, and 1 stop bit.

4). Baud Rate

The baud rate is selectable at either 300 baud, or the same as the baud rate of the data being received.

2.7 ECHO DATA OUTPUT

1). Interface Type
RS232, RS422/485 and 20 mA current loop.

2). Message Format
The message format is identical to the format of the data being received.

3). Data Format
The data format is identical to the format of the data being received.

4). Baud Rate
The baud rate is the same as the baud rate of the data being received.

2.8 ANALOG OUTPUT

1). Output Type
Isolated 0 to 5 VDC, 0 to 10 VDC and a 4 to 20mA current loop. Any two of the three outputs may be used at one time.

2). Load Resistance
100K Ohm minimum for voltage outputs.500 Ohm maximum for 4 to 20mA current loop.

3). Resolution
1 part in 10,000.

4.) Linearity
Better than .1% full scale.

5.) Zero Temperature Coefficient
100 ppm of full scale per ºC.

6.) Span Temperature Coefficient
60 ppm per ºC.
If more than one output is used, the output NOT selected for calibration will have an error of less than 1%.

7.) Zero offset adjustment range is approximately ±10% of span.

8.) Span adjustment range is approximately ±10% of span.

2.9 READY OUTPUT

Fused Output - 120 VAC, 1 Amp Standard -24 VDC or Dry Contact Optional.

3. INSTALLATION INSTRUCTIONS

3.1 PRELIMINARY INSPECTION

Upon opening the shipping carton, inspect the unit for loose or damaged parts. If any damage is found, immediately notify the carrier.

Open the enclosure and verify that all internal harnesses are firmly seated in the correct connector.

! CAUTION
DO NOT APPLY POWER TO THE UNIT UNTIL ALL CONNECTIONS HAVE BEEN MADE, ALL JUMPERS HAVE BEEN PROPERLY INSTALLED AND ALL DIP SWITCHES HAVE BEEN PROPERLY SET.

3.2 MOUNTING

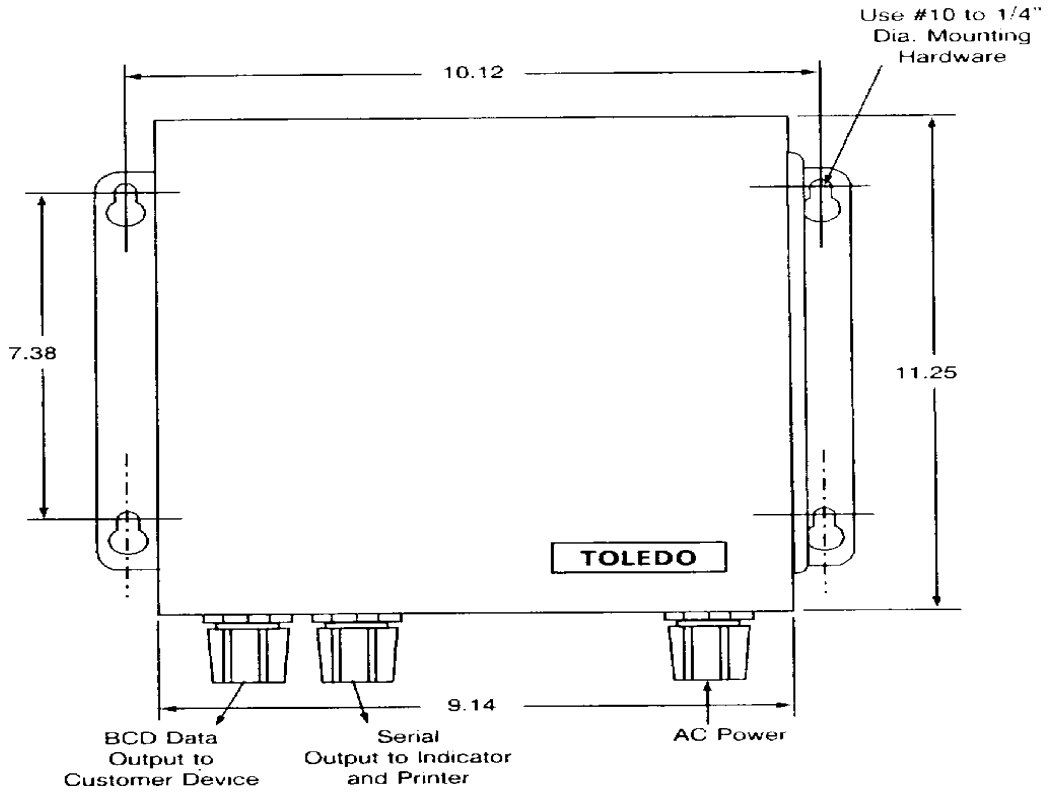
3.2.1 MILD STEEL OF STAINLESS STEEL UNITS

The enclosure provided must be secured to a flat metallic or non-metallic surface by the installer. The “keyhole” holes in the mounting flange are designed to accept #10 to 1/4” diameter bolts for this purpose. For removal convenience, the “keyhole” holes have a major diameter of .62”. If the installer would use screws or bolts with head diameters less than 5/8”, the bolts would not have to be removed, only loosened, to remove the enclosure for service. Position the enclosure small diameter slot toward the top so it will not fall from its mounting.

If the enclosure is mounted to an ungrounded surface, (wood, masonry, etc.) means must be provided to ground the enclosure. This ground connection may be made via connecting conduit or with a separate # 12 awg (min.) green wire from the enclosure to a grounded object.

Mounting dimensions along with the enclosure size is shown in the figure below:

Figure 3.1 Mounting Dimensions



3.2.2 CAST ALUMINUM EXPLOSION PROOF UNIT

WARNING!!

Before any installation, maintenance testing or repair work on this enclosed is begun, the area must be de-classified to a non-hazardous condition. Failure to observe this precaution could result in bodily injury, property damage or both.

The enclosure must be secured to a flat metallic grounded surface capable of supporting 36 lb. (16.2 kg) enclosure. The mounting feet on each side of the enclosure are designed for 3/8" mounting bolts. All bolts must have flat washers where they mate with the feet surface, The recommended mounting centers are 10.75" horizontally and 8.12" vertically to allow for a small amount of misalignment with the enclosure. See Figure 3.2 below.

All wiring to and from the enclosure must be made with rigid metal electrical conduit suitable for use in the customer's classified environment per all local and national electric codes. Mettler Toledo supplies 3/4" sealing fittings for all enclosure openings, but it is the responsibility of the installer to properly install and seal these fittings prior to operating equipment.

After enclosure installation and conduit connections are made, but before the areas is made hazardous, the cover must be closed and all bolts must be secured FINGER TIGHT. All bolts must then be tightened alternately to 30 FT/LB (DRY).

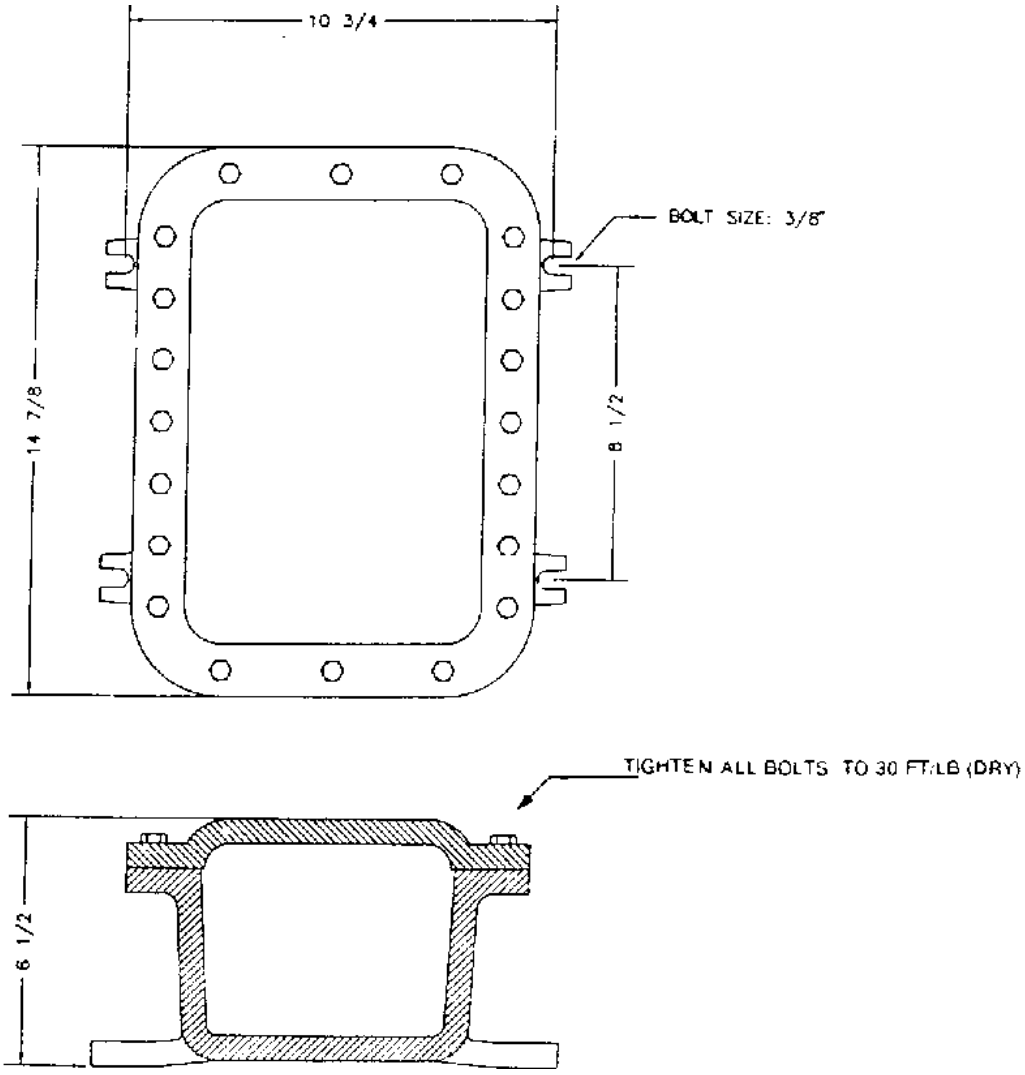
WARNING!!

1. Mettler Toledo NEMA 7/0 Analog Module, Model #9325-0032 is suitable for hazardous locations rated Class I & II, Division I &II, applicable Groups B.C.D.E.F.or G AND NEC TEMPERTAURE RATING T6

2. See Mettler Toledo drawing 901560 for equipment locations, wiring and installation.

3. Verify with the responsible customer representative that the hazard present is rated within the class, division and group classifications shown about and that the auto-ignition temperature of hazardous material present exceeds the T6 temperature rating, 85ºC (185 ºF., as defined by NFPA)70, the National Electric Code. Article 500. If the hazard rating does not fit these classifications or cannot be determines, prior to performing any installation work, refer this matter to: Mettler Toledo, Product Marketing, (800) 786-5123.

Figure 3.2 Aluminum Explosion Proof Enclosure Mounting Dimensions



3.3 AC POWER

Verify that the AC wiring at TB1 is correct for the power being applied. Refer to drawing 900732 at the back of this manual for schematic wiring diagram.

115 VAC OPERATION	230 VAC OPERATION
1 - 115 VAC	1 - 230 VAC
3 - 115 VAC Common	6 - 230 VAC Common
Jumper 2 to 5	Jumper 3 to 5
Jumper 4 to 6	Connect Ground Wire to Ground Stud
Connect Ground Wire to Ground Stud	

3.4 SERIAL INTERFACE

Connect the serial interface able from the indicator to TB2. If fiber optics interface is used, plug the fiber optic cable into the fiber optic receiver J14. If a printer or other accessory is used, connect its interface cable to TB2 also. Refer to drawing 900741 in the back of this manual for schematic wiring diagram. Mettler indictor output is current loop passive. Mettler data output must be set to “S.CONT”, “0 pause” as well as correct parity and baud rate. Jumper W2 must be placed in the position corresponding to the type of serial interface used. The maximum recommended cable lengths are 50 ft for RS232, 1000 ft for 20 mA current loop, and 2000 ft for RS422/485.

TB2# Serial Interface

1. RS232 TxD
2. RS232 RxD
3. Signal Ground
4. RS485 TA
5. RS485 TB
6. RS485 RA
7. RS485 RB
8. 20 mA RCL Sink
9. 20 mA RCL Source
10. 20 mA TCL Sink
11. 20 mA TCL Source
12. Shield

3.5 ANALOG OUTPUT

Connect the cable from the users device to the appropriate Analog Output signal terminals on terminal strip J1. Refer to drawing 900741 at the back of this manual for schematic wiring diagram.

IMPORTANT!!

The maximum recommended cable length for the signal output is 50 feet for 0-5 or 0-10 VDC signals and 1000 feet for 4/20mA signals. The recommended cable for use with the analog output is 2-conductor, 20 gauge standard cable. (BELDEN # 8762 or

equivalent), which is available under Mettler Toledo part number 510220190.

RECOMMENDED LOAD RESISTANCE

J1	OUTPUT SIGNALS	OUTPUT	RESISTANCE IN OHMS
1	4-20mA Output	0-5 VDC	100k Minimum
2	Signal Ground	0-10 VDC	100 k Minimum
3	0-10 VDC Output	4-20 mA	500 Maximum
4	0-5 VDC Output		
5	Ready Output -		
5 (fused)	Ready Output+		

3.6 READY OUTPUT

The READY OUTPUT is provided to indicate when no scale errors exist. The output will be turned ON under normal operating conditions. If a time out error occurs due to loss of data for 2 seconds or longer, if the indicator foes negative or positive out of range, or if the weight data is received exceeds the calibrated zero or span values, the ready output will be turned OFF. The ready output supplied is a solid state 115 VAC output. A 24 VDC or a dry contact module may be installed if required. use caution when wiring the output module. Low voltage circuits share the same terminal strip. Refer to drawing 900741 in the back of this manual for output current ratings and schematic wiring diagram.

3.7 JUMPER DESCRIPTION

The Analog Output Module PC boards include several jumpers that must be installed according to the application. Refer to figure 3.1 for jumper locations.

W1 - Jumper W1 is used to select whether the serial output port is to echo data received or to output printer data. If interfacing the serial output to another accessory, place the jumper in the ECHO position. If interfacing the serial output to a printer place the jumper in the DATA position.

W2 - Jumper W2 is used to select which serial receiving device is to be used. Place the jumper in the location corresponding to the receive interface used.

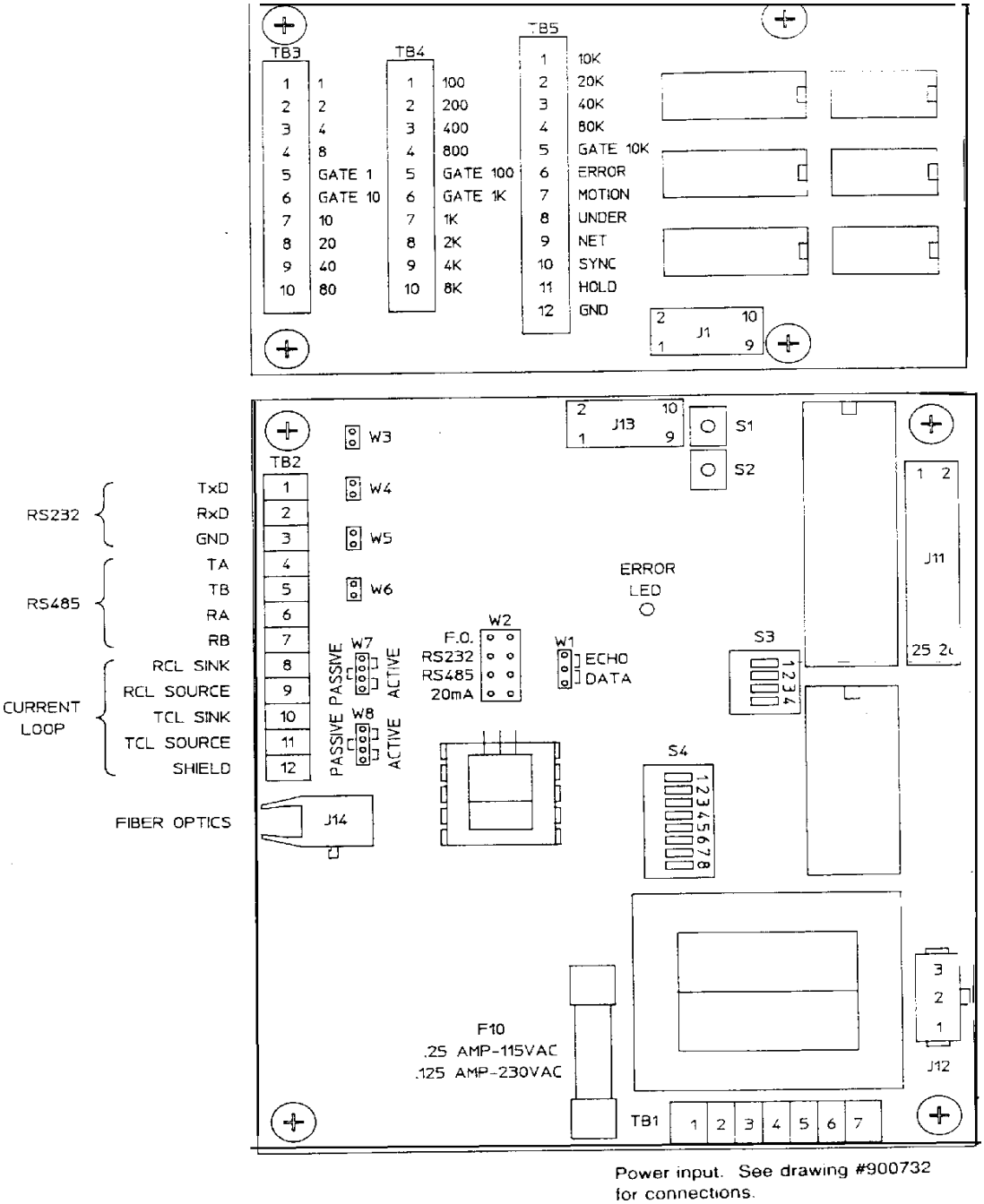
W3, W4- Jumpers W3 and W4 are used to install or remove termination resistors for the RS485 transmitter lines. Normally these jumpers are not installed. These jumpers may be required if the unit is connected to a receiving device that does not provide any type of termination for its receive lines.

W5, W6- Jumpers 5 and 6 are used to install or remove termination resistors for the RS 485 receiver lines. When the unit is connected on RS485 network, these jumpers should be installed on the board if the unit is installed at the end of a node. The jumpers should also be installed on a point to point interface if a long interface cable is used in order to eliminate signal reflections or cross talk in the cable. Otherwise, these jumpers should be removed.

W7 - Jumper W7 is used to configure the 20 mA **receive** port either active or passive. If the indictor is active, then the jumper must be placed in the PASSIVE position. If the indicator is passive, then the jumper must be placed in the ACTIVE position.

W8 - Jumper W8 is used to configure the 20 mA **transmit** port either active or passive. If the printer or accessory is active, then the jumper must be placed in the PASSIVE position. If the printer or accessory is passive, then the jumper must be placed in the ACTIVE position.

Figure 3.2 Jumper Locations



DIP SWITCH ASSIGNMENTS:

*S3

1	2	3	4	
OFF	ON	ON	OFF	SELECT 9325 PROGRAM-FACTORY SET FOR BCD OUTPUT MODULE

S4

1	2		
*OFF	OFF	=	NORMAL CALIBRATION
ON	OFF	=	ZERO CALIBRATION
OFF	ON	=	SPAN CALIBRATION
ON	ON	=	SPAN CALIBRATION X10

3	OFF	=	OUTPUT GROSS WEIGHT
	*ON	=	OUTPUT DISPLAYED WEIGHT
4	OFF	=	OUTPUT FULL LIMIT OF ZERO ON ERROR
	*ON	=	OUTPUT FULL LIMIT OF SPAN ON ERROR
5	OFF	=	PRINT AT RECEIVE BAUD RATE
	*ON	=	PRINT AT 300 BAUD RATE
6	*OFF	=	NORMAL PRINT
	ON	=	EXPANDED PRINT

7	8	
OFF	OFF	NO PRINT OUTPUT
ON	OFF	PRINT DISPLAYED DATA
*OFF	ON	PRINT SINGLE LINE GROSS-TARE-NET
ON	ON	PRINT THREE LINE GROSS-TARE-NET

JUMPER ASSIGNMENTS

W1	1 TO 2 ECHO RECEIVED DATA
	*2 TO 3 OUTPUT PRINTER DATA
W2	1 TO 8 RECEIVE FIBER OPTIC
	2 TO 7 RECEIVE RS232
	3 TO 6 RECEIVE RS485
	*4 TO 5 RECEIVE 20 mA

W3,W4 TERMINATION FOR RS485 TRANSMIT LINES - IN = TERMINATION*
W5,W6 TERMINATION FOR RS485 RECEIVE LINES - IN -= TERMINATION*
W7 ACTIVE/PASSIVE SELECT FOR 20 mA RECEIVE - 1-2 & 3-4 = ACTIVE
2-3 = PASSIVE*
W8 ACTIVE/PASSIVE SELECT FOR 20 mA XMIT - 1-2 & 3-4= ACTIVE*
2-3 = PASSIVE

* = DEFAULT POSITIONS SET AT FACTORY

Figure 3.3 Jumper and Dip Switch Assignments

3.8 SERIAL INTERFACE PCB DIP SWITCH DESCRIPTION

Two banks of dip switches are used to configure the 9325 for operation. Figure 3.4 lists the switches and their functions. A detailed description of the switches and their functions is included here.

NOTE: The 9325 address switches (S3) must not be changed with power on. Doing so will cause incorrect operation.

S3-1 thru 4 These switches are used to select the program to be executed by the microprocessor. The eprom on this board contains several programs so that one PC board may be used in more than one product. The switches must be set as shown in figure 3.3 for proper operation in the 9325.

S4-1 This switch is used to select positive true or negative true (complimented) BCD output. Whenever this switch is ON, the BCD output data will be positive true logic. Otherwise the BCD output data will be negative true logic. The polarity of the status signals are all 0's if an error occurs. If positive true BCD is selected, the output will go to all 1's on an error condition. If negative true BCD is selected, the output will go to all 0's. The status outputs always go high during an error condition.

S4-2 This switch determines whether the sync pulse output is active all of the time or active only when there is no motion. If this switch is ON, the BCD output will represent the displayed weight. If this switch is OFF, the BCD output will represent the gross weight when the indicator is in the net or gross mode.

S4-3 This switch determines whether the BCD output will represent the displayed weight or the gross weight. If this switch is ON, the BCD output will represent the displayed weight. If this switch is OFF, the BCD output will represent the gross weight when the indicator is in the net or gross mode.

S4-4 This switch determines whether the 5 most significant or 5 lest significant digits will be output. If this switch is ON, the 5 most significant digits will be output. This is intended for sue when the indicator is counting by X10 or X100. If this switch is OFF, the 5 least significant digits will be output.

S4-5 This switch determines the baud rate at which the printer data will be sent. If this switch is ON, the printer data will be transmitted at 300 baud. If this switch is OFF, the printer data will be transmitted at the same baud rate as the data that is being received.

S4-6 This switch determines whether the weight will be printed in the expanded mode or in the normal mode. If this switch is ON, the expanded mode is enabled. In this mode, the weight field will be expanded. If G-T-N format is selected, only the net weight field will be expanded. If this switch is OFF, all data will be printed in the normal size. Reference Section 3.7 for printer format information.

S4-7 and 8 These switches are used to select the format of the printer data. The three formats that may be selected are single line of displayed weight, single line of GROSS-TARE- NET, or three lines of GROSS-TARE-NET. Output is upon demand and is triggered by the indicator PRINT button. This printer output

is not available when interfaced using the Masstron continuous data format or the Mettler continuous data format or the Mettler continuous format. If both of these switches are OFF, no data will be sent. Refer to the following examples for actual switch selections.

S3-1 thru 4 These switches are used to select the program to be executed by the microprocessor. The eprom on this board contains several programs so that one PC board may be used in more than one product. The switches must be set as shown in figure 3.4 for proper operation in the 9325. DO NOT SET OR CHANGE S3 SWITCHES WITH POWER APPLIED TO THE 9325.

CAUTION
DO NOT CHANGE S3 SWITCHES WITH POWER APPLIED TO THE 9325. DO NOT APPLY POWER TO THE UNIT UNTIL ALL JUMPERS AND SWITCHES HAVE BEEN CONFIGURED.

3.9 PRINTER FORMATS

Printer data is selectable via S4 switch positions 6, 7, and 8. W1 must be in the data position. All printer output data is sent as 10-bit ASCII (1 start, 7 data bits, 1 even parity bit, 1 stop bit). The weight field will be shortened to 6 characters in length if the weight data does not include a decimal point. If the scale indicator is in the Gross weight mode, the printed data will not include the tare or net weights even if G-T-N is selected via setup switches. Leading zeros are transmitted as spaces.

The powerup message is available to the output of the 9325 even when printing is disabled via S4 switches. Jumper W1 determines whether the data will be transmitted or not.

CR	LF	M	O	D	E	L	SP	9	3	2	5	CR	LF	S	O	F	T	W	A	R	E

SP	N	U	M	B	E	R	SP	*	9	0	0	7	3	9	0	0	A	CR	LF

* May be space or letter indicating software revision.

POWER UP MESSAGE FORMAT

GROSS
WEIGHT
ONLY

STX	MSD	-	-	-	-	->	LSD	SP	L/k	B/g	CR	LF

OR

NET
WEIGHT

ONLY

STX	MSD	-	-	-	-	->	LSD	SP	L/k	B/g	SP	N	E	T	CR	LF

S4-6 OFF, 7 ON, 8 OFF

DISPLAYED WEIGHT ONLY - NORMAL PRINT

GROSS
WEIGHT
ONLY

STX	SO	MSD	-	-	-	-	->	LSD	SP	L/k	B/g	SP	N	E	T	CR	LF

OR

NET
WEIGHT
ONLY

STX	SO	MSD	-	-	-	-	->	LSD	SP	L/k	B/g	SP	N	E	T	SI	CR	LF

S4-6 ON, 7 ON, 8 OFF

DISPLAY WEIGHT ONLY - EXPANDED PRINT

GROSS
WEIGHT

STX	MSD	-	-	-	-	->	LSD	SP	L/k	B/g	CR	LF

TARE
WEIGHT

MSD	-	-	-	-	->	LSD	SP	L/k	B/g	SP	T	R	CR	LF

NET
WEIGHT

S O	M S D	-	-	-	-	->	L S D	S P	L / k	B / g	S P	N	E	T	S I	C R	L F

[WEIGHT DATA]

S4-6 OFF, 7 ON, 8 ON

GROSS, TARE, NET - MULTIPLE LINE - NORMAL PRINT

GROSS
WEIGHT

S T X	M S D	-	-	-	-	->	L S D	S P	L / k	B / g	C R	L F

TARE
WEIGHT

M S D	-	-	-	-	->	L S D	S P	L / k	B / g	S P	T	R	C R	L F

NET
WEIGHT

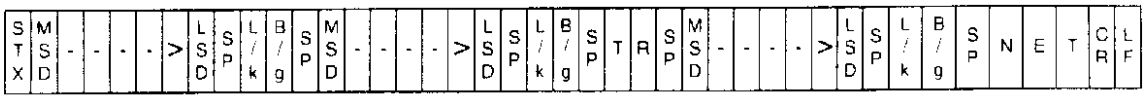
S O	M S D	-	-	-	-	->	L S D	S P	L / k	B / g	S P	N	E	T	S I	C R	L F

[WEIGHT DATA]

S4-6 ON, 7 ON, 8 ON

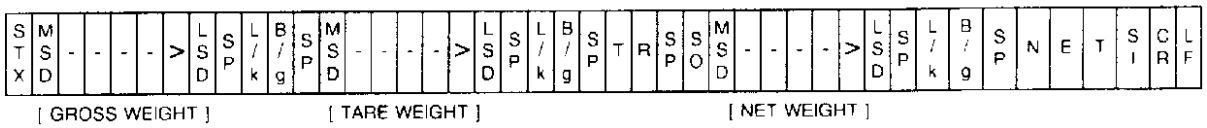
GROSS, TARE, NET - MULTIPLE LINE - EXPANDED PRINT

3.7 PRINTER FORMATS (Continued)



S4 - 6 OFF, 7 OFF, 8 ON

GROSS, TARE, NET - SINGLE LINE - NORMAL PRINT



S4 - 6 ON, 7 OFF, 8 ON

GROSS, TARE, NET - SINGLE LINE - EXPANDED PRINT

4. CALIBRATION

CAUTION!
DO NOT TOUCH LIVE PORTIONS OF THE CIRCUIT BOARD DURING CALIBRATION. 110/230 VAC PRESENT.

Calibration of the 9325 Analog Output Module is performed digitally by using DIP switches and pushbuttons. Because of this, the analog output may be zeroed or spanned at any weight value. This provides the capability of calibrating the Analog Output Module ''backwards'' so that the analog output is at zero when the scale is at full capacity, and at span when the scale is at zero. The 9325 provides for separate calibration of pounds and kilograms so that the analog output accurately represents the indicator's weight when switching between weight units. A special X10 span calibration mode allowed calibration using 10% of the span weight for applications where it is not practical to load the scale to full scale. The ready output is turned OFF while calibration switches S4-1 and/or S$-2 are ON. (X10 Calibration).

Note: The adjustment range of zero or span is limited to approximately ±10% of span.

4.1 ZERO CALIBRATION

4.1.1 Turn S4-1 ON to select zero calibration.
4.1.2 Set the indicator to the weight indication corresponding to the analog zero output value.
4.1.3 Press S2 to increase the analog output signal or S1 to decrease it.
4.1.4 Press both S2 and S1 simultaneously and hold for one second to store the zero calibration data.
4.1.5 Turn S4-1 OFF.

4.2 SPAN CALIBRATION

4.2.1 Turn S4-2 ON to select span calibration.
4.2.2 Set the indicator to the weight indication corresponding to the analog span output value.
4.2.3 Press S2 to increase the analog output signal or S1 to decrease it.
4.2.4 Press both S2 and S1 simultaneously and hold for one second to store the span calibration data.
4.2.5 Turn S4-2 OFF.
4.2.6 Switch the indicator to the other units (lb or kg), and repeat the zero and pan calibration procedure. When both S4-1 and 2 are turned OFF, the unit will resume normal operation.

4.3 X10 SPAN CALIBRATION

4.3.1 Turn both S4-1 andS4-2 ON to select the X10 span calibration.
4.3.2 Set the indicator to 10% of the weight indication corresponding to the analog span output value.
4.3.3 Press S2 to increase the analog output signal or S1 to decrease it. Adjust to full span analog output value.
4.3.4 Press both S2 and S1 simultaneously and hold for one second to store the span calibration data.
4.35 Turn S4-1 and S4-2 OFF.
4.3.6 Switch the indicator to the other units (lb or kg), and repeat the zero and pan calibration procedure. When both S4-1 and 2 are turned OFF, the unit will resume normal operation.

4.4 EXPANDING THE ACTIVE RANGE

The 9325 analog module is designed to freeze the analog output at the full calibrates value and turn off ready output if the weight received is outside of the calibrated range. (Reference section 5.7). There may be applications where this is not desirable. For example, a tank scale had a capacity of 10,000 lb, but 5,000 lb is the maximum weight ever used, so it is decided to calibrate the 9325 for a range of 0lb for 4mA and 5,000 for 20mA, providing the maximum resolution.

IF the weight from the indicator exceeds 5,000 lb, the ready output will turn off and the analog output will freeze at 20mA. A similar situation exists at zero; if the weight from the indicator is negative by even one lb, the analog output will freeze at 4mA and the ready output will turn off.

To prevent a nuisance condition such as this, an offset can be calibrated into the zero and the span adjustments. Here is a brief example:

Using the 10,000 lb tank with 5,000 lb working range, determine that we don’t want to freeze the output of turn off the ready output if we go jut a few pounds under zero or a few pounds over 5,000. First, determine how much is a nuisance. (For this example, let’s say 50lb.) Next, we calculate how much signal 1lb equals.

Signal range - 4mA to 20mA = 16 mA differential
16mA divided by 5,000 lb = 0.0032mA/lb

Now, calculate the signal that represents 50lb.
0.0032mA/lb x 50 lb = 0.16mA

Now we are ready to calibrate the 9325 with the desired offset. Set the indicator to read 50lb below zero. Set the zero calibration to read 3.84 mA. (This represents 50 lb below zero, 4mA-0.16mA). Now set the indicator to read 5050 lb. Set the span calibration to read 20.16 mA (this represents 50lb over full range of 5,000lb).

The 9325 will output now 4mA when the indicator is 0 and will output 20mA when it is 5,000lb. The outputs will not freeze, nor will the ready output turn off until the indicator weight goes more than 50 lb below or 50 lb above 5,000 lbs, thus eliminating the nuisance factor.

The adjustment range of zero and span is limited to approximately ±10% of span.

5. OPERATION

Because the serial interface PCB is used in several different products the microprocessor stores a signature code in NOVRAM along with calibration data based upon the program selected by S3. This may cause a board to indicate a NOVRAM error when the board is first used in the 9325. If a NOVRAM error occurs, try recalibrating the unit.

1). Upon power up, the Analog Output Module has been set to the error value as determined by S4-1. The ready output will be turned off.

2). The microprocessor will test its internal RAM. If an error is detected, the LED on the PC board will blink error code 2 and further operation will be inhibited.

3). The microprocessor will automatically recognize the format of the data being received from the indicator. While performing the auto-recognition, the LED on the OC board will blink 3 times and pause. The will continue until valid data is received. Auto recognition should not take more than 10 seconds.

4). To ensure that the data has not been corrupted, the microprocessor will then check the stored calibration data by reading the data from NOVRAM and comparing a computed checksum against the stored checksum. If an error occurs, the LED will blink four times then pause. This will continue until the unit has been recalibrated.

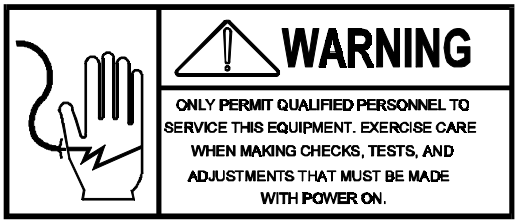
5). Once the unit receives valid data and passes the RAM and NOVRAM tests, the ready output will be turned on and the analog output will represent the weight data received. The LED will alternately blink ON for one second and OFF for one second. The power up message will be transmitter out the printer port.

6). If the unit fails to receive valid data within 2 seconds, or if the indicator goes negative or positive out of range, the analog output will be set to the error value as determined by S4-4, and the ready output will be turned off. The LED will blink the appropriate error code until valid data is received. Normal operation will then resume.

7). If the weight exceeds the calibrated zero or span value, the analog output will freeze at the calibrated limit, as long as

the indicator does not go out of range, and the READY output will be turned off.

6. TROUBLESHOOTING



1). Check to insure that the appropriate AC voltage is present at terminal strip TB1. Also, check to ensure that the wiring is correct. Refer to drawing 900741 at the back of this manual for schematic wiring diagram.

2). Check the AC line fuse F10 on the Serial interface Controller PCB and the AC line fuse F-4 on the Analog Output PCB to make sure they are not blown.

3). Observe the LED on the Serial Interface controller. Refer to the LED error codes listed on the following page for error codes and possible causes.

4). If the LED does not light or show a legitimate error code, check the setting of the DIP switches on S3. If an invalid setting is selected, the microprocessor will not run. Also make sure that these switches are set properly for the 9325. If the LED still doesn't light or show a legitimate error code, then replace the Serial Interface Controller PCB and check for proper operation.

5). If the unit is receiving data from the indicator, the LED will alternately blink on for one second and off one second. If the unit appears to be receiving data, but the analog signal output does not seem to function properly, proceed to the next step. If the LED is flashing an error code refer to the LED error codes listed below.

6). Turn ON S4-1 and check the analog output signal. If the signal is not at its calibrated zero value, try recalibrating the unit and check for proper operation without any remote device connected. If the problem persists, replace the Analog Output PCB and check for proper operation. If the unit does not work properly when connected to a remote device, check to make sure the remote device's input impedance is within the specified limits. (Refer to Section 1.8.2).

7). Turn OFF S4-1, turn ON S4-2 and check the analog output signal. If the signal is not at its calibrated span value, try recalibrating the unit and check for proper operation without any remote device connected. If the problem persists, replace the Analog Output PCB and check for proper operation. If the unit does not work properly when connected to a remove device, check to make sure the remote device's input impedance is within the specified limits. (Refer to Section 1.8.2).

NOTE: If the 9325 LED is flashing an error code, the analog output will go to its full limit as determined by S4-4, regardless of S-1 and S4-2 switch settings.

LED ERROR CODES

NOTE: 1 Blink is Normal Operation

If the unit is receiving proper data from the indicator, the blink rate is approximately one/second. This is not an error.

2 Blinks - RAM Error

The microprocessor has detected an error in its internal RAM. Replace the Serial Interface Controller Board.

3 Blinks - Auto Recognition Error

The unit is waiting receive valid data from the indictor. Make sure that the jumpers W1 through W8 are in the correct positions for the type of interface used. Check the interface wiring between the indicator and terminal strip TB2. Also make sure that the indictor is sending data with the checksum at one of the specified baud rates.

4 Blinks - EEPROM Error

The serial interface PCB has never been calibrated in a 9325 or the microprocessor had detected a checksum error for the calibration data stored in the EEPROM. Try recalibrating the unit, If the problem persists, replace the Serial Interface Controller PCB. Then calibrate and check for proper operation

5 Blinks - Receive Error

The microprocessor has failed to receive valid data within 2 seconds. Check to insure that the indicator is sending data. This error will only occur once the unit has performed Auto Recognition successfully.

6 Blinks - Over Capacity Error

The indicator is sending status information telling the controller that the scale is over capacity.

7. PARTS LIST

Part number	Description
900740 00A	Serial Interface Controller PCB
134028 00A	Analog Output OCB
095920 00A	1/4 Amp Slo-Blo Fuse - F10
133802 00A	1 Amp Pico Fuse -F1
900735 00A	Dry Contact Module
KN761984020	24 VDC Output Module
KN764493020	115 VAC Output Module
900742 00A	Ribbon Harness Assembly

900713 00A	Power Harness Assembly
134031 00A	Analog Output Terminal Mating Connector
119241 00A	Power Terminal Strip Mating Connector

8. DRAWINGS

Part Number	Description
900741	External Wiring Diagram
901563	Installation Layout and Wiring (Explosion Proof Unit)
90074700A	Assembly (NEMA 12)
90074800A	Assembly(NEMA 4X)
90103400A	Assembly (Panel)
90155900A	Assembly (Explosion Proof)