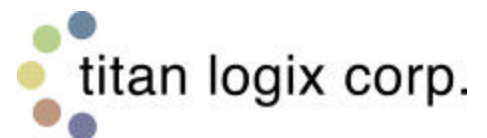


Model 2300

Operation Manual



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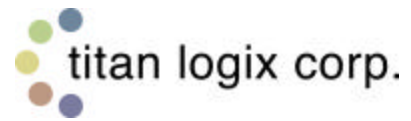


Manufactured in Canada

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MODEL 2300 REMOTE DISPLAY

Manufactured in Canada

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CSA DATA

CSA PRODUCT CLASS:

2258 02 – Process Control Equipment for Hazardous Locations

SUBJECT:

Class I, Groups B, C, D

REMOTE DISPLAY (CLASS I, DIV. 2, GROUPS B, C, and D)

Input: 10 to 28 VDC External, 4-20mA loop receiver

Output: Two sets of SPDT sealed relay contacts: 0.2 A/250 VAC, 0.6 A/125 VAC general, 2.0 A/30 VDC, 0.6 A/125 VDC resistive

POWER REQUIREMENTS

This unit requires 10 to 28 VDC to operate. The power consumption is approximately 4.15 watts. This includes the Power Supply Board, the differential board, the relay board, and the display board.

The displays use a switching power supply that draws constant wattage regardless of input voltage. For example, at 24 volts input a basic unit would require $4.15 \text{ W}/24\text{V} = 123\text{mA}$, but at 12 volts it would require $4.15 \text{ W}/12\text{V} = 346\text{mA}$. This is an important point to consider if the gauge is being driven from a linear power supply with fold back current limiting. For example, if a 24 V linear supply is rated for 500mA it may appear to be adequate to drive a display, however, during startup, it may not provide enough current. When turning on the power supply the voltage ramps up from 0 volts to maximum voltage (in this case 24 volts). At lower voltages the display requires *more* current to start up. Therefore it is possible that at, say, 6 volts input, the gauge will draw 500mA, and the linear supply may fold back its current to 100mA at 6 volts output to protect itself from overheating. In this case, the system would not be able to start up.

The power input is protected from reverse polarity power application, and has a 1 amp fuse to protect the electronics in the event of a short circuit. The power connection is made via a two pole terminal block on the power supply board. This connection is internal connected to the backpan. The field electrical connections are via the 8 pole terminal block on the lower left hand portion of the backpan.

SPECIFICATIONS

REMOTE DISPLAY CALIBRATION AND TYPE

Max. Number of Points	2000
Calibration type	Linear or volumetric
Calibration information	Tank dimensions, table, metered fluid
Display size	Four 0.8" high digits
Display type	High brightness red LED
Signal source	4-20 mA loop
Input type	100 ohms to ground 100 ohms differential

RELAYS

Number of relays	2
Contacts	Form C (SPDT)
Contact rating	0.6 A @ 125 VAC / 2 A @ 32 VDC
Setting capability	Independent on and off points Set with potentiometer

ENCLOSURE

Class I, Div. 2	10" wide X 8" high X 6" deep
-----------------	------------------------------

REMOTE DISPLAY:

The remote display is driven from a 4-20 mA signal. It requires 10 to 28 VDC. If the 4-20 mA transmitter is powered by a separate 24 VDC input, the negatives must be connected together for the system to function. ***Using the differential inputs/outputs wired in series, several remote displays can be operated from the one 4-20 mA signal up to a maximum of 6 displays with a 24 volt supply for the 4-20 mA loop.***

RELAYS:

The relays are located just below the display board. Two Form C (SPDT) sealed relays are supplied. The turn on and off points of the relays can be individually set, and the two relays function completely independent from each other. To set the relays, the appropriate set button is pushed and the control adjusted until the display reads the desired value. Do not set the OFF point higher than the ON point, as this will cause the relay to turn on and off at the same point, possibly resulting in relay chatter.

CALIBRATING THE DISPLAY

Dip the tank to see what the display should be reading. If the display reads differently, then it has to be adjusted up or down by the OFFSET potentiometer on the upper left hand side of the display board until it reads the correct value.

The display must have either a linear or volumetric calibration EPROM installed which would contain the strap table information in order for the display to read correctly. If a volumetric reading is required, in most cases this can be produced simply by providing Titan Logix with the tank dimension and then having the appropriate EPROM made. In some special cases, such as a horizontal cylinder or sphere, etc., a special custom volumetric EPROM must be created. This is due to each height increment resulting in a different volumetric reading. The data can be supplied by the original manufacturer of the tank or may have to be custom created using water calibration.

EXAMPLE:

AT 5 cm height, total volume = 3m³
Difference of 1m³/cm
At 10 cm height, total volume = 8m³
Difference of 2m³/cm
At 15 cm height, total volume = 18m³
And so on.

SETTING THE RELAYS

The gauge can be in full operation during the set procedure, and the display switches over to reading the relay set point when the set button is depressed. The relay set point is displayed in the same units as the fluid level display. Electrical connections are also internally connected to the lower right hand side of the back pan for field connections to the relays.

EXAMPLE:

Problem: It is desired to control a pump to drain the tank and to have an overflow alarm. The pump should come on at the 100 cubic meter level in the tank, and should pump down to the 50 cubic meter level. The alarm should come on at the 150 cubic meter level.

Solution: Select Relay #1 to control the pump. Depress the ON button for Relay #1 and adjust the control until the display reads 100 cubic meters. Depress the OFF button for Relay #1 and adjust the control until the display reads 50 cubic meters. Since the relay energizes when the fluid level rises above the ON point, connect the pump control wiring to the COM (common) and NO (normally open) contacts of relay #1. Select Relay #2 for the high level alarm. Depress the ON

button for Relay #2 and adjust the control until the display reads 150 cubic meters. Since the OFF point must be below the ON point, depress the OFF button and adjust for a bit less than 150, such as 145 cubic meters. Connect the alarm wiring to the COM and NO contacts of Relay #2. Now if the high level alarm is activated, the fluid level has to drop below 145 meters to deactivate the alarm.

CUSTOM VOLUMETRIC READOUTS **(Using water calibration to create a custom volumetric EPROM)**

NOTE: The following steps apply when the EPROM in the display is a 1999 calibration EPROM which the customer will use to create a fluid calibration chart specific to his tank.

Record the company, site location, and tank number on the calibration sheet.

To create the custom calibration, record the gauge reading for every 100, 200, 500 litres or other increments of fluid added to the tank. Return this information to Titan Logix and a calibrated EPROM will be made up and sent to you.

NOTE: The smaller the increments, the more accurate the display will be. The EPROM can store 2000 lines of data.

INSTALLING AN EPROM

NOTE: Perform the following operation with the power OFF (either by pulling the power connection to the display, or by having the power turned OFF).

Be extremely careful about static discharge which may damage the EPROM or electronics. To install a new EPROM (sent from Titan Logix), carefully remove any old EPROM. Insert the new EPROM so that the writing is upright and the notch in the EPROM is directed to the left of the display. Make sure all legs of the IC are securely inserted (not bent). You can now reconnect power to the display.

TROUBLESHOOTING

Relays are chattering

Probable cause(s)

- (1) The relay load may be too great (ie: relay attempting to switch too much power), or (2) the relay off point is set higher than the relay on point, or (3) a damaged relay board, or (4) a damaged display board.

Service action

- (1) Check the current and voltage applied to the contacts on the relay(s) against the allowable limits. If the limits are exceeded, reduce as required. This may require the use of an interposing relay between the 2300 relay and the load that is being driven.
- (2) Check the relay set points and adjust as necessary. If the contact stat (NO or NC) is not going to work for you application, you will require an interposing relay between the 2300 relay and the load that is being driven.
- (3) Replace the relay board.
- (4) Replace the display board.

If the problem is not solved, then call Titan Logix for assistance.

Four Digit LED Display is Dim (not bright)

Probably cause(s)

- (1) The power supply voltage is too low, or (2) the negative is not solidly connected, or (3) the 4 digit LED display is damaged.

Service Action

- (1) Using a voltmeter, check the voltage at the power and ground terminals of the 4 digit LED display. If the supply voltage is too low (i.e. less than 10 volts) use a larger supply to bring within specifications.
- (2) Connect the negative solidly
- (3) Replace the 4 digit display board

Fluid Level is Lower Than What the Display Reads

Probable cause(s)

- (1) The OFFSET adjustment on the 4 digit LED display is not set properly, or (2) the decimal point is in the improper location, or (3) the SCALE adjustment on the 4 digit LED display has been tampered with, or (4) the 4-20 mA signal is not properly calibrated

Service Action

- (1) Calibrate the remote display using the OFFSET adjustment
- (2) Move the decimal point to the proper location via the jumper on the display board
- (3) If this is not the problem, the SCALE adjustment may have to be adjusted. Call Titan Logix for assistance.
- (4) Calibrate the 4-20 mA signal coming from the transmitter so that it is proper.

Display Reading is at One Level All the Time

Probable cause(s)

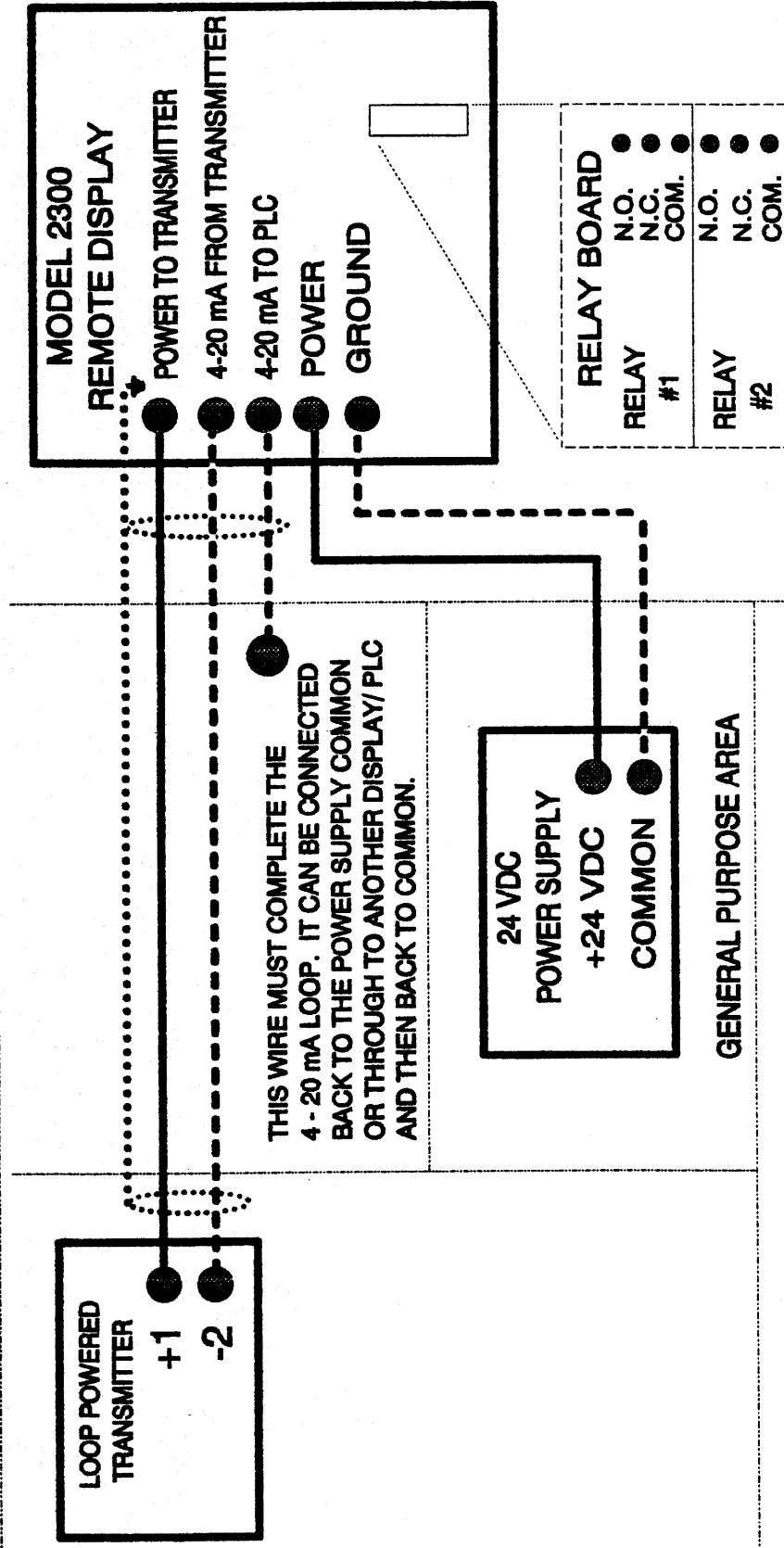
- (1) There is not 4-20 mA signal being received by the display, or (2) the display negative is not common with the transmitter negative, or (3) the 4-20 mA loop is not complete.

Service Action

- (1) Connect the 4-20 mA signal to the display
- (2) Connect the display negative with the transmitter negative
- (3) Be sure that the 4-20 mA output from the display is connected to another device such as a PLC or is tied to negative in order to complete the loop.

If you require additional assistance, please call Titan Logix Corp. at: (780) 462-4085 in Edmonton, or at (306) 487-2883 in Lampman, SK.

CONNECTING A LOOP POWERED ACTIVE 4-20 mA TRANSMITTER



NOTES: "NEW DESIGN BACKPAN"

ONLY USE 18 AWG, TWISTED PAIR, SHIELDED INSTRUMENT CABLE FOR SIGNAL WIRING. ADDITIONAL RELAY BOARDS ARE OPTIONALLY AVAILABLE.
RELAYS ARE FORM C RATED ONLY.

**RATED FOR CLASS 1
DIV. 2 AREA**

FILE NAME: 23REMMD4.DRW	TITAN Technologies 447-2171 14516 - 115 Ave, Edmonton, AB
PROJECT: MODEL 2300 REMOTE LEVEL GAUGE DISPLAY	
REVISION: A	DRAWING TITLE: WIRING DRAWING
DATE: SEPTEMBER 5, 2000	DRAWING TYPE: INSTALLATION
	DESIGNER: TODD CHAMNEY

DISPLAY OFFSET ADJUSTMENT

SCALE OFFSET

DISPLAY PCB

SELECTS DECIMAL LOCATION

DECIMAL LOCATION

REMOVE THESE TWO SCREWS AND SWING AWAY DISPLAY PCB TO ACCESS BOTTOM PCB CONTAINING POWER AND 4-20 mA DIFFERENTIAL CONNECTIONS.

RELAY CONNECTIONS (DETACHABLE CONNECTOR)

NO = NORMALLY OPEN CONTACT WHEN THE FLUID LEVEL IS BELOW THE SET POINT
NC = NORMALLY CLOSED CONTACT WHEN THE FLUID LEVEL IS BELOW THE SET POINT
COM = COMMON CONTACT

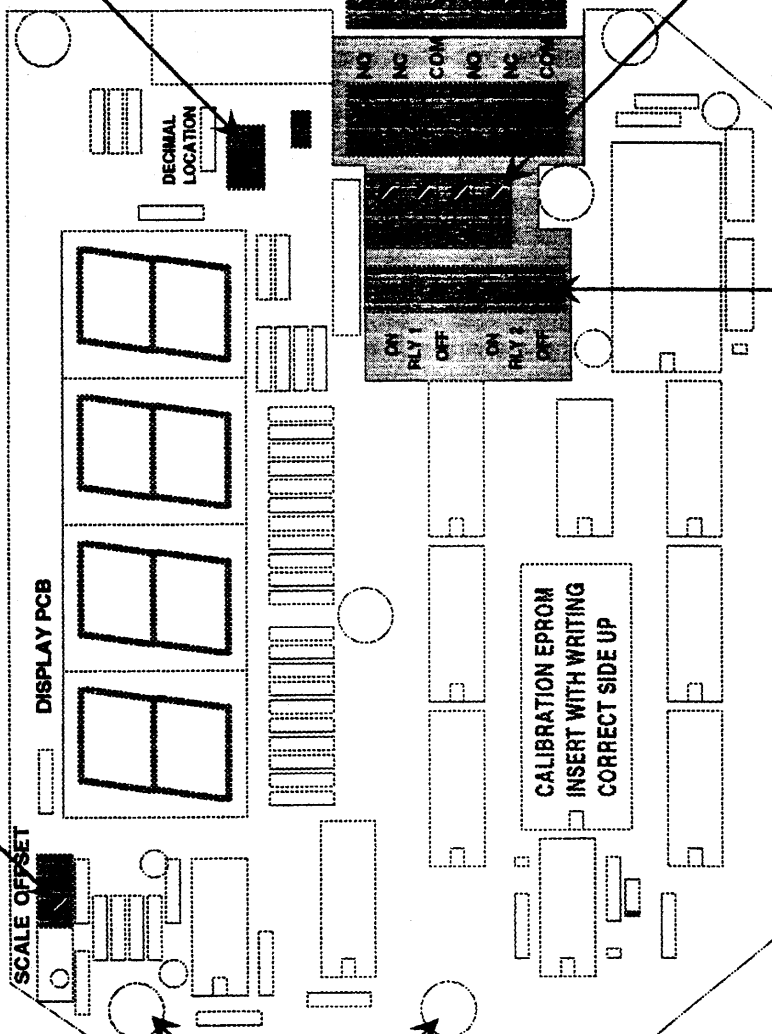
ADJUST CONTROLS TO SET TRIP POINTS

DEPRESS SWITCH TO VIEW RELAY TRIP POINT SETTING

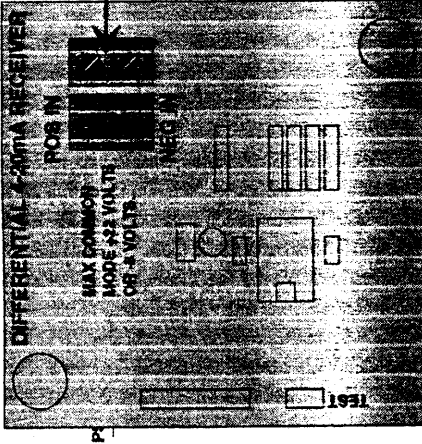
CALIBRATION EPROM INSERT WITH WRITING CORRECT SIDE UP

NOTES:

- THE DISPLAY SCALE SETTING IS FACTORY SET AND SHOULD NOT NORMALLY REQUIRE FIELD ADJUSTMENT.
- USE EXTREME CARE IF REMOVING OR INSTALLING THE EPROM TO AVOID STATIC DISCHARGE DAMAGE OR BENT PINS. NEVER REMOVE OR INSTALL THE EPROM WITH THE POWER ON.
- MAKE CERTAIN THAT THE AREA IS KNOWN TO BE NON-HAZARDOUS BEFORE ADJUSTING THE RELAY TRIP POINTS OR CHANGING THE DECIMAL LOCATION.



FILE NAME: 23REMDIS.DRW	TITAN Technologies 447-2171 14518 - 115 Ave, Edmonton, AB
PROJECT: MODEL 2300 REMOTE LEVEL GAUGE DISPLAY	
REVISION: A	DRAWING TITLE: INSTALLATION DRAWING NO. 2300 PAGE 9
DATE: November 28, 1998	DRAWING TYPE: INSTALLATION
	DESIGNER: TITAN Technologies



4-20 mA CONNECTIONS TERMINAL BLOCK
(DETACHABLE CONNECTOR)
POS IN = POSITIVE
NEG IN = NEGATIVE
NOTE: THE POS IN TERMINAL CONNECTS
TO THE 4-20 TRANSMITTER (DIRECTLY
OR VIA ANOTHER REMOTE DISPLAY)
AND THE NEG IN TERMINAL CONNECTS
TO GROUND (DIRECTLY OR VIA ANOTHER
REMOTE DISPLAY OR PLC).

FUSE 1 AMP

MAX
1 AMP
DC

-6V

POWER
GROUND
10-28VDC
500 mA MAX

POWER CONNECTIONS
TERMINAL BLOCK.
NEGATIVE GROUND POWER
IS REQUIRED.

FILE NAME: 23REMP8.DRW	TITAN Technologies 447 - 2171 14518 - 115 Ave, Edmonton, AB
PROJECT: MODEL 2300 REMOTE LEVEL GAUGE DISPLAY	
REVISION: A	DRAWING TITLE: INSTALLATION DRAWING NO. 2300 PAGE 10
DATE: NOVEMBER 28, 1998	DRAWING TYPE: INSTALLATION
DESIGNER:	TITAN Technologies

POWER CONNECTIONS
NEGATIVE GROUND
POWER IS REQUIRED.

DETACHABLE CONNECTORS

POWER +10 TO +28 VDC INPUT
GROUND INPUT
POWER TO TRANSMITTER
GROUND TO TRANSMITTER
4-20 mA FROM TRANSMITTER
4-20 mA TO PLC
GROUND
SV BUS FROM TRANSMITTER
PROGRAMMER POWER
PROGRAMMER GROUND
PROGRAMMER SV BUS

THE 4-20 mA OUTPUT CONNECTS TO GROUND
(DIRECTLY OR VIA ANOTHER REMOTE DISPLAY
OR PLC).

CAN BE USED AS TERMINALS
TO EXTEND CONNECTIONS TO
ANOTHER PANEL

NO = NORMALLY OPEN CONTACT
WHEN THE FLUID LEVEL IS
BELOW THE SET POINT
NC = NORMALLY CLOSED CONTACT
WHEN THE FLUID LEVEL IS
BELOW THE SET POINT
COM = COMMON CONTACT

RELAY #1 NO
RELAY #1 NC
RELAY #1 COM
RELAY #2 NO
RELAY #2 NC
RELAY #2 COM

RELAY CONNECTIONS

BACKPAN PRINTED CIRCUIT BOARD

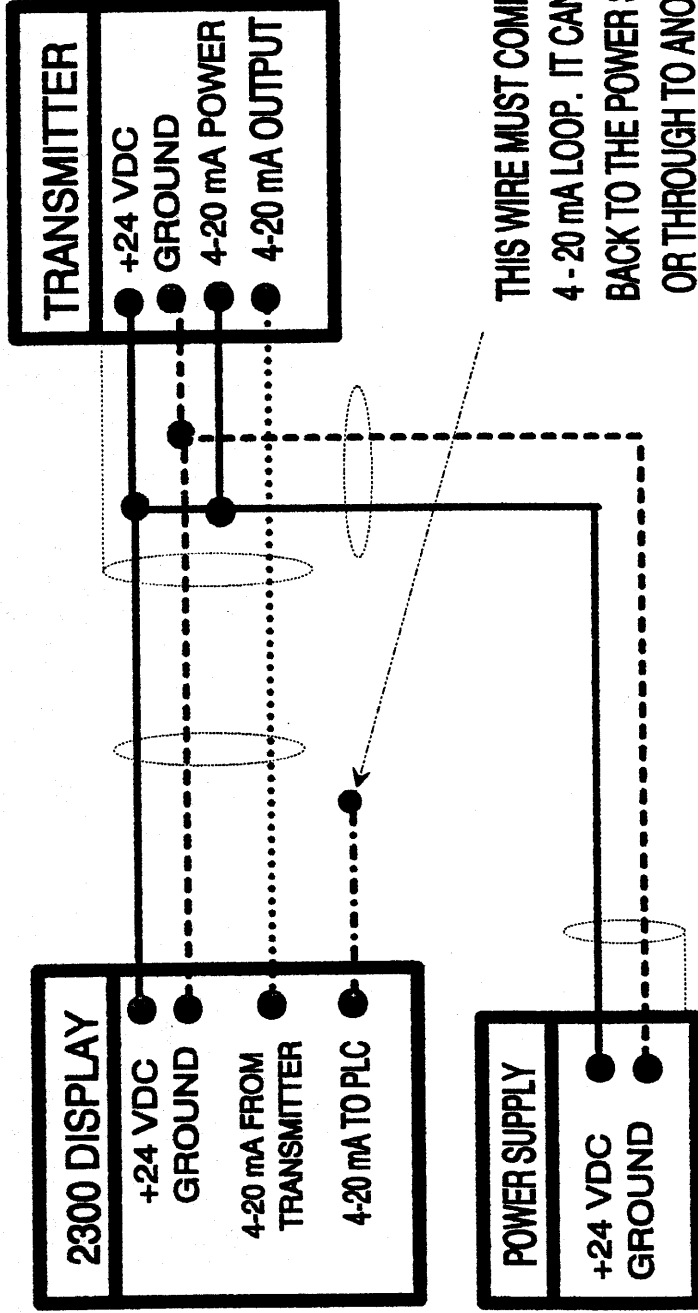
NOTE: SV BUS CONNECTIONS ARE ONLY F
WITH TITAN TECHNOLOGIES TPZ//I
ELECTRONICS

"NEW DESIGN"

INCLUDES WIRING CONNECTIONS FOR USE WITH
TITAN TECHNOLOGIES TPZ TRANSMITTER AND
LOON ELECTRONICS FOR EASE OF WIRING AND
PROGRAMMING.

FILE NAME: 2000RMP.DRW	TITAN Technologies 447-2171 14518 - 115 Ave, Edmonton, AB
PROJECT: MODEL 2000 REMOTE LEVEL GAUGE DISPLAY	
REVISION: A	DRAWING TITLE: INSTALLATION DRAWING NO. 2300 PAGE 12
DATE: SEPTEMBER 6, 2000	DRAWING TYPE: INSTALLATION
	DESIGNER: TODD CHAMNEY

CONNECTING A PASSIVE 4 WIRE 4-20 mA TRANSMITTER



THIS WIRE MUST COMPLETE THE 4 - 20 mA LOOP. IT CAN BE CONNECTED BACK TO THE POWER SUPPLY COMMON OR THROUGH TO ANOTHER DISPLAY/PLC AND THEN BACK TO COMMON.

NOTES: "NEW DESIGN BACKPAN"

THE GROUNDS REFERRED TO HERE ARE THE NEGATIVE OF THE +24 VDC POWER SUPPLY.
 THE GROUNDS (NEGATIVES) MUST BE COMMON THROUGHOUT THE SYSTEM.
 USE 18 GAUGE, TWISTED PAIR, SHIELDED INSTRUMENT CABLE ONLY.

FILE NAME: 23REMVD3.DRW	TITAN Technologies 447-2171 14518 - 115 Ave, Edmonton, AB
PROJECT: MODEL 2300 REMOTELEVEL GAUGE DISPLAY	
REVISION: B	DRAWING TITLE: INSTALLATION DRAWING NO. 2300 PAGE 14
DATE: SEPTEMBER 6, 2000	DRAWING TYPE: INSTALLATION
	DESIGNER: TODD CHAMNEY