

MicroVission Controller

Retrofit Guide



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1.0 General Information

This procedure defines the steps required to install Vilter ´s MicroVission panel as the controller for a 400 series reciprocating compressor.

It is highly recommended that the instructions be reviewed prior to retrofitting.

Figures and tables are included to illustrate key concepts.

Safety precautions are shown throughout the manual. They are defined as the following:

WARNING - Warning statements are shown when there are hazardous situations, if not avoided, will result in serious injury or death.

CAUTION - Caution statements are shown when there are potentially hazardous situations, if not avoided, will result in damage to equipment.

NOTE & NOTICE - Notes and notices are shown when there is additional information pertaining to the instructions explained.

2.0 MicroVission Installation Recommendations

These instructions are designed to help you perform the safe removal of your current controller and the installation the MicroVission controller as replacement.

WARNING

Ensure power/control switches are in the off position and all power are disconnected. Follow lockout procedure prior to working on electrical equipment. Failure to comply may result in serious injury or death.

WARNING

After stopping the compressor, allow the compressor and surrounding components to cool down prior to servicing. Failure to comply may result in serious injury.

WARNING

Use appropriate lifting devices and additional personnel when lifting heavy components. Ensure lifting devices are capable of lifting the weight of the component. Use lifting points (i.e. bolt holes designated for lifting eye bolts) that are provided on the component. Failure to comply may result in serious injury.

2.1 Installation when retrofitting from Viltech, Vantage, or Keypad control panels

Step 1. Shut Off the 120V power to the control panel and isolate the compressor by shutting Off all service valves and lock-out per plant procedure. Remove and recover the refrigerant from the compressor so it is at 0 psig.

Step 2. Disconnect the wiring and remove the control panel and the mounting arms that support the vibration isolators under the bottom of the panel.

WARNING

When handling microcontroller, use additional personnel or lifting device as required. Failure to comply may result in serious injury and/or damage to equipment.

Step 3. Install the Mounting Brackets in KT1133A¹ to the current control panel support using the hardware in the kit. Locate the bottom 7/16" holes on the retrofit bracket and drill thru the panel support. Mount the vibration isolators (KT1133A1) to the four holes in the retrofit bracket, see Figure 1.



Figure 1. Kit KT1133A

¹ List of kits and itemization of components on Table 2 at the end of this guide.

NOTE

Torque all hardware according to specifications, see Table 1 at the end of this guide

NOTE

If excessive vibration occurs, further support from the controller bracket to the base may be required

NOTE

The UL version of the Keypad Micro is wider and requires additional cross supports. Kit KT822A contains the parts necessary to perform the adaptation, see Figure 2

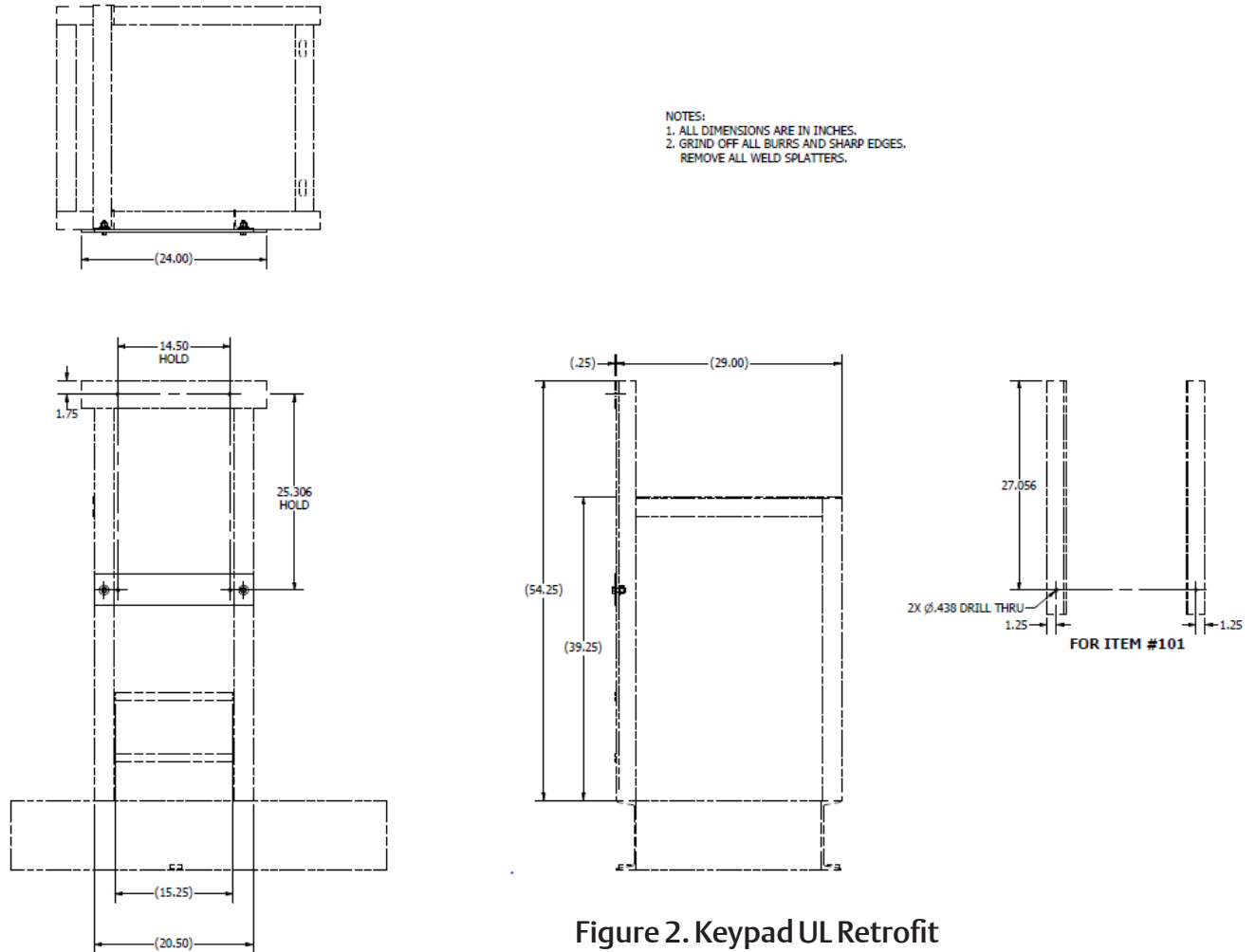


Figure 2. Keypad UL Retrofit

KT822A		
Item number	Quantity	Item name
1726D	2.00	NUT 7/16-14NC-2B HEX HVY PLAIN
13265FZ	4.00	WASHER 7/16 USS ZINC PLTD
13165ES	2.00	WASHER 7/16 LOCK 304SS
41801G	1.00	BRACKET, CONTROL PANEL RETROFIT

Step 4. Mount the vibration isolators on the mounting brackets and bolt the MicroVission panel to the isolators using the hardware in KT1133A1 (see Figure 3).



Figure 3. MicroVission Panel on Support Bracket

Step 5. Remove the existing pressure transducers and RTD's and replace RTD wells as needed. Install the five new transducers and three new RTD's from instrumentation and process kits (see Table 2) and wire to the MicroVission using the cords and cord grips in the kit. Wire the unloader solenoid valves and crankcase heater with the cord provided in the kit. Wire tie the cords to the compressor base as needed.

NOTE

If replacing a VILTech, which only uses 3 transducers, 2 additional ones (contained in instrumentation kits KT1133A7 & KT1133A8) will be needed at the Tri-Micro filter housing to read filter pressure drop, on the inlet & outlet pressure points. Mount and install 1/4" ASTM A179 steel tubing (provided by others) between pressure transducers, suction, discharge, and oil manifold connections.

See Figure 4 for Tri-Micro configuration with pressure switch, and Figure 5 for Tri-Micro with transducers to read inlet and outlet pressures.

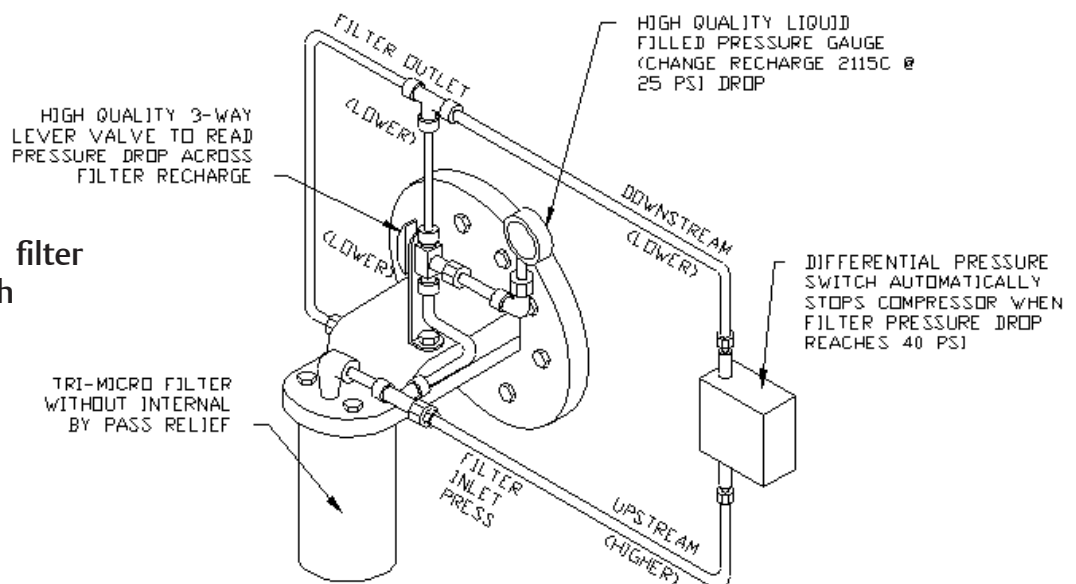


Figure 4. Tri-Micro filter with pressure switch



Figure 5. Tri-Micro filter with pressure transducers

Step 6. Install the 4-20mA current transmitter to sense the amperage at the motor terminal box, and connect to the analog input at the MicroVision panel.

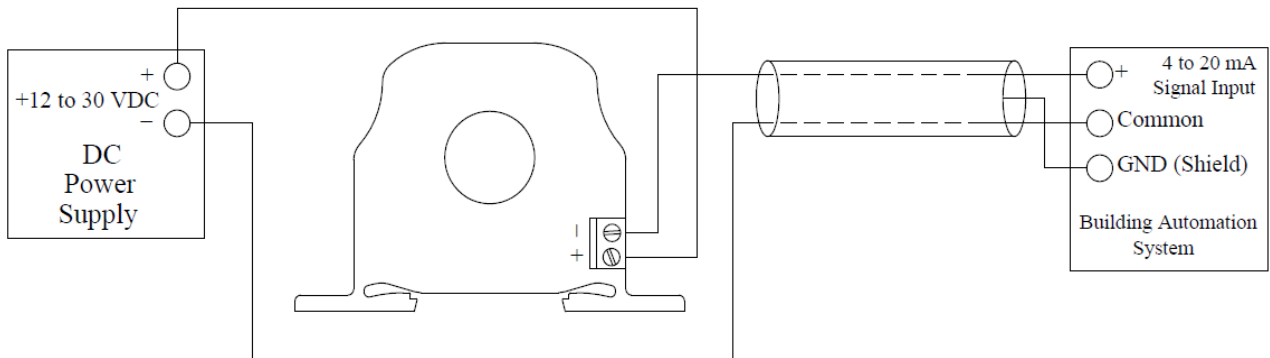


Figure 6. Connection of 4-20mA Current Transmitter (Sensor)

NOTE

The Keypad and VILTech Micro-controllers did not have an amperage input, and the Vantage used a different type CT, so the acquisition of current transmitter (VPN 3669CT) is imperative to work with the MicroVision panel. This transmitter is contained in retrofitting kit KT24X20MV, see Table 2.

Step 7. Go to section 3.0 for wiring instructions.

2.2 Installation when retrofitting from pressure switches

The mounting position of the MicroVission controller will depend on the type of drive your compressor uses, see Figure 7 for reference.

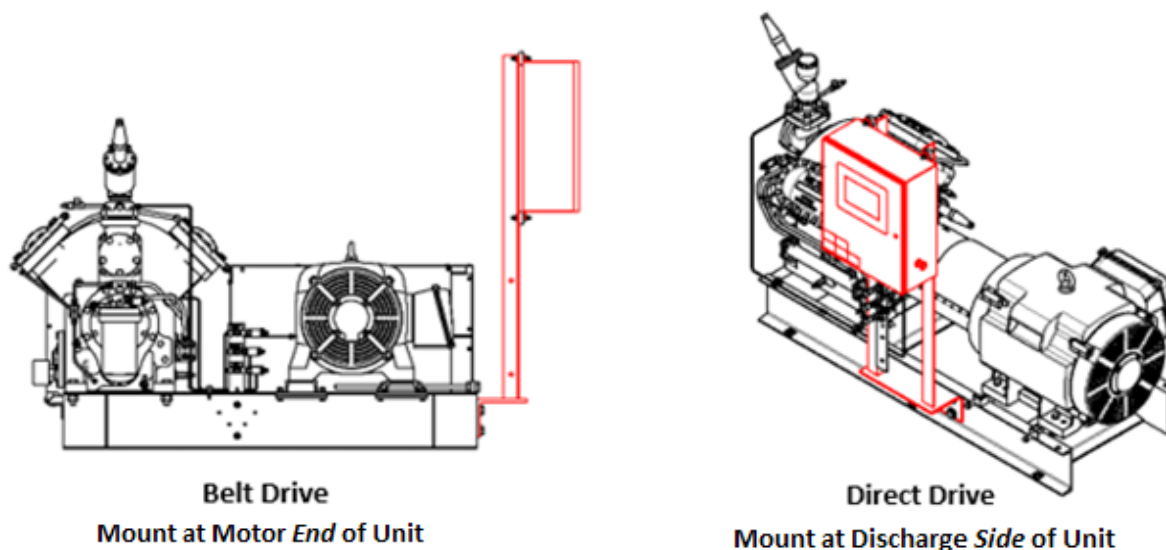


Figure 7. Belt Drive and Direct Drive mounting

- Step 1.** Shut Off the 120V power to the compressor controls and isolate the compressor by shutting Off all service valves and lock out per plant procedure. Remove and recover the refrigerant from the compressor so it is at 0 psig.
- Step 2.** Disconnect the wiring and remove the existing pressure switches (or Non-Vilter control panel) and all control tubing.
- Step 3.** Position the bottom edge of the MicroVission frame flush with the bottom of compressor base. Mark and drill four (4) 0.8125" (13/16") holes, see Figure 8.

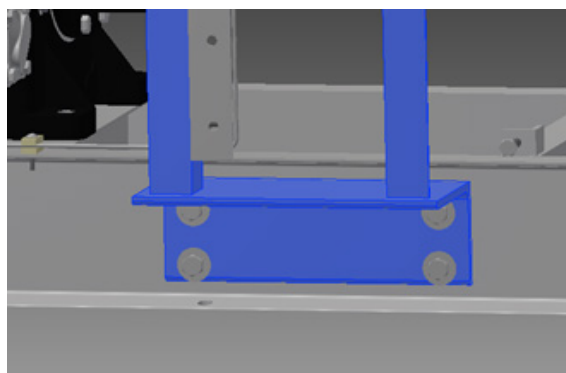


Figure 8. MicroVission Support

Step 4. Mount the MicroVission bracket to the compressor frame with four (4) 3/4” bolts and hardware provided. If the compressor base is filled with concrete the bracket can be welded to the compressor frame. Follow standard practices for welding and fabrication procedures.

WARNING

When handling microcontroller, use additional personnel or lifting device as required. Failure to comply may result in serious injury and/or damage to equipment.

NOTE

If excessive vibration occurs, further support from the controller bracket to the base may be required

Step 5. Mount the Block & Bleed bracket with valves and hardware from KT1133A9(A10) and install the pressure transducers as shown as in Figure 9 and Figure 10.

Mount and install 1/4” ASTM A179 steel tubing (provided by others) between pressure transducers, suction, discharge, and oil manifold connections.

Verify correct transducer pressure ranges:*

Suction	Discharge	Oil Manifold
0-200 psia	0-414.5 psia	0-200 psia

*0-414.5 psia intermediate on integral 2-stage compressors

Figure 9. Tubing According to Compressor’s Drive: Direct Drive (Left) & Belt Drive (Right)

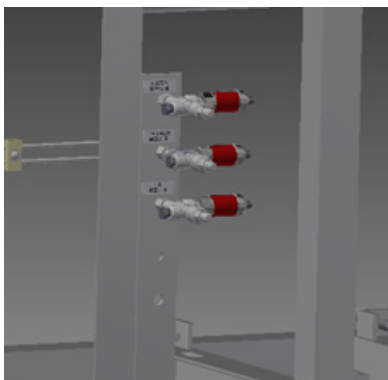
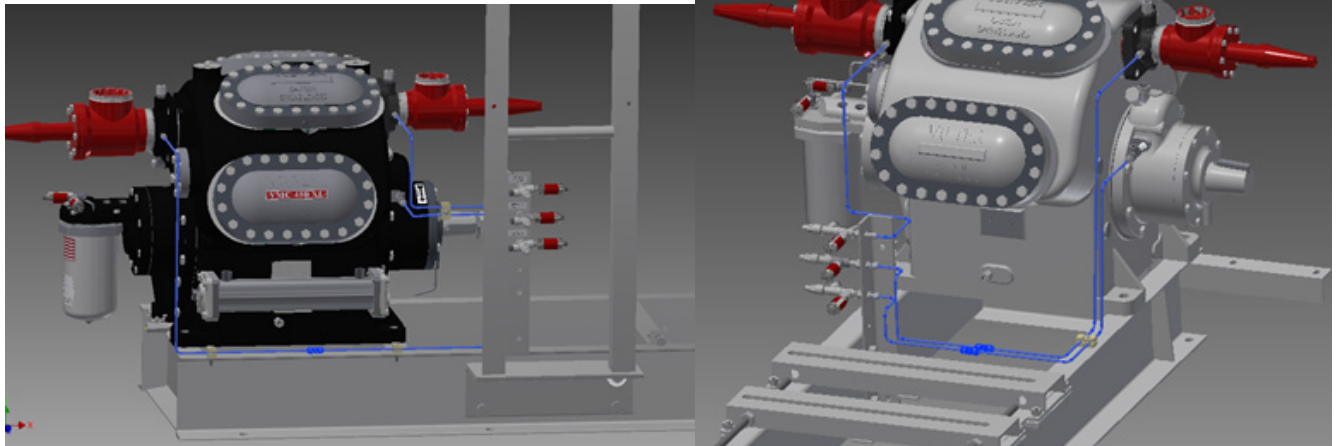
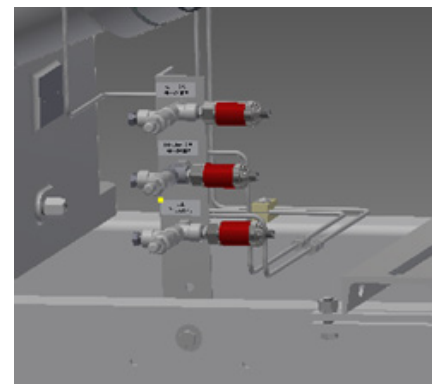


Figure 10. Direct Drive Transducer Mounting (left) and Belt Drive Transducer Mounting (right)



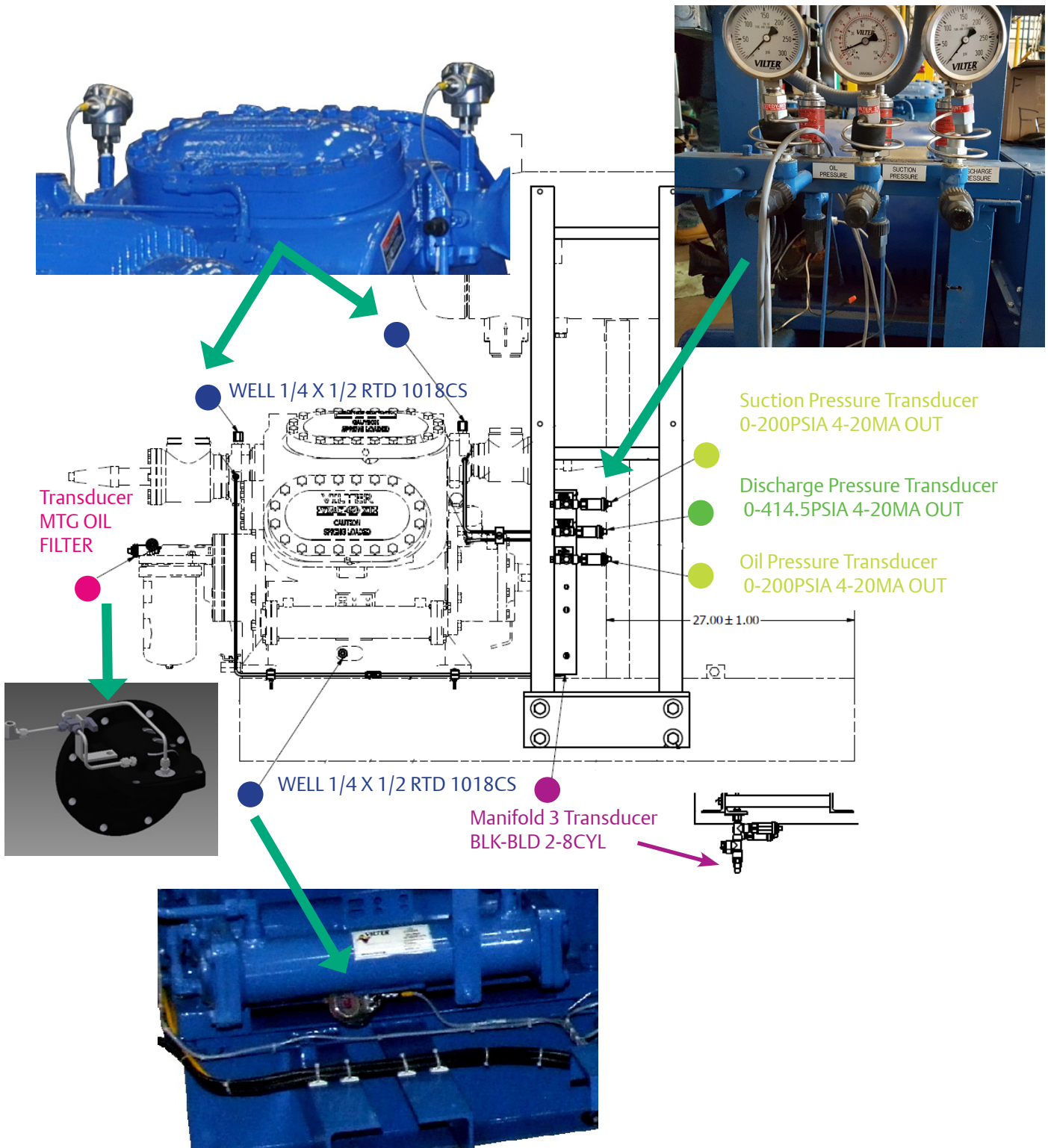


Figure 11. Well & Transducers Location

Figure 12. Tri-Micro Filter with Pressure Transducers for Inlet and Outlet Pressures



Step 6. Run control tubing from the valves on the Block & Bleed bracket to the compressor as shown in Figures 8, 9 & 10.

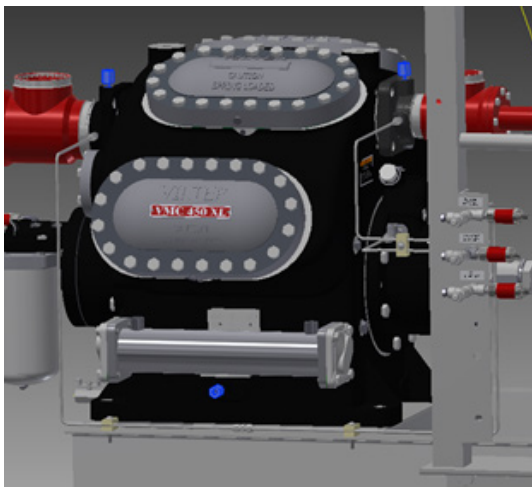


Figure 13. Location of RTDs (shown in blue)

Step 7. Install Filter Inlet and Filter outlet transducers on the Tri-Micro filter housing as shown in Figure 12.

Step 8. Install wells and mount RTDs for suction, discharge and oil temperature, see Figures 10 & 12.

NOTE

12 and 16-cylinder compressors require two discharge RTDs one in each discharge line.

Step 9. Wire the transducers and RTD's to the MicroVission using the cords and cord grips in KT1133A4(A5). Wire the unloader solenoid valves and crankcase heater with the cord provided in the kit. Wire tie the cords to the compressor base as needed.

Step 10. Install the 4-20mA current transmitter to sense the amperage at the motor terminal box, and connect to the analog input at the MicroVission panel, see Figure 14.

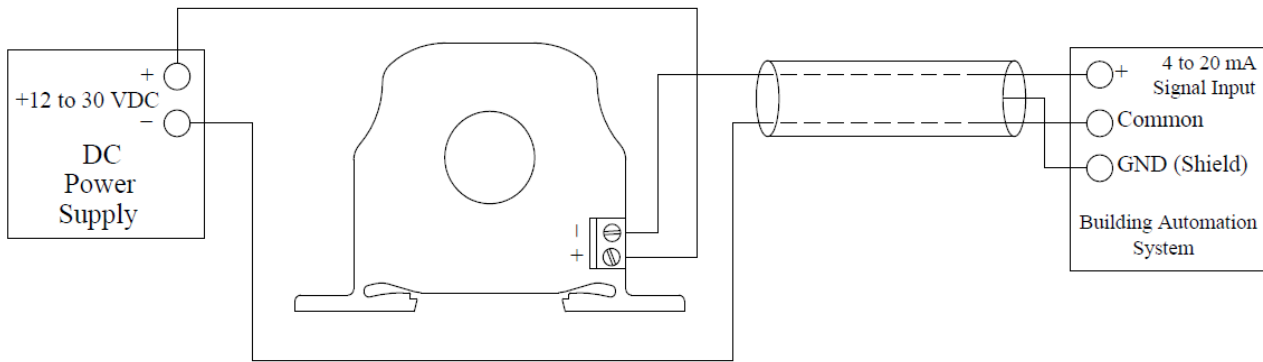


Figure 14. Connection of 4-20mA Current Transmitter (Sensor)

NOTE

The Keypad and VILTech Micro-controllers did not have an amperage input, and the Vantage used a different type CT, so the acquisition of current transmitter (VPN 3669CT) is imperative to work with the MicroVission panel. This transmitter is contained in retrofitting kit KT24X20MV, see Table 2.

Step 11. Go to section 3.0 for wiring instructions.

3.0 Field Wiring

WARNING

Ensure power/control switches are in the off position and all power are disconnected. Follow lockout procedure prior to working on electrical equipment. Failure to comply may result in serious injury or death.

NOTICE

Before applying power to the MicroVission control panel, all wiring to the panel should be per the National Electrical Code (NEC). Specifically check for proper voltage and that the neutral is grounded at the source. An equipment ground should also be run to the panel.

NOTICE

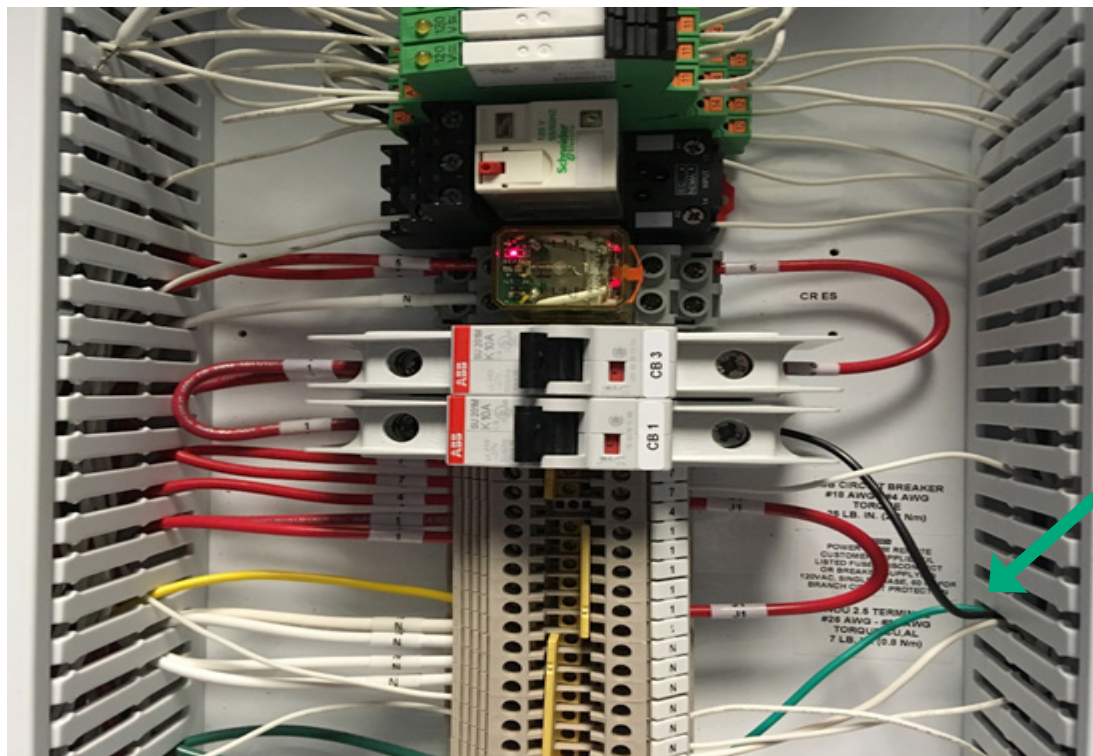
Always follow your employer's electrical safety program and NFPA 70E when working around and in energized equipment – this manual is not a substitute for NFPA 70E.

CAUTION

Do not route A/C and D/C wires together, this will cause Electromagnetic Interference (noise). Failure to comply may result in damage to equipment.

3.1 Power and Input/Output Wiring at the Panel

Step 1. Connecting 120VAC power: take a look at the wires on the right hand side of panel, run through DIN rail to breaker CB1. This corresponds to the power distribution hookup on SHEET 10 of the drawing set, see Figure 14.



Black: 120 VAC
White: Neutral
Green: Ground

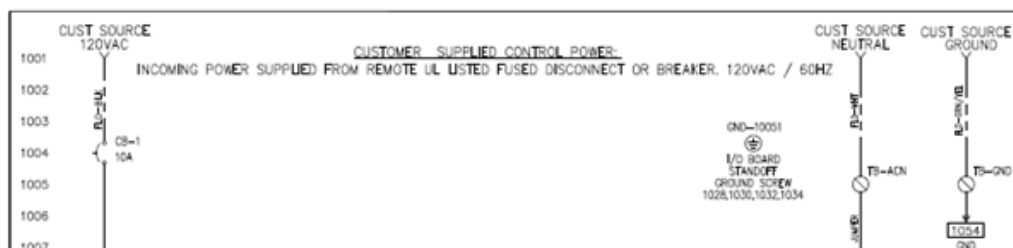


Figure 15. 120 VAC Connection to MicroVission

Step 2. Connecting digital inputs/outputs: take a look at the 4 black screw terminals on the right side of the large multi Input/Output board. These terminals correspond to SHEET 12 of the drawing set, see Figure 16.

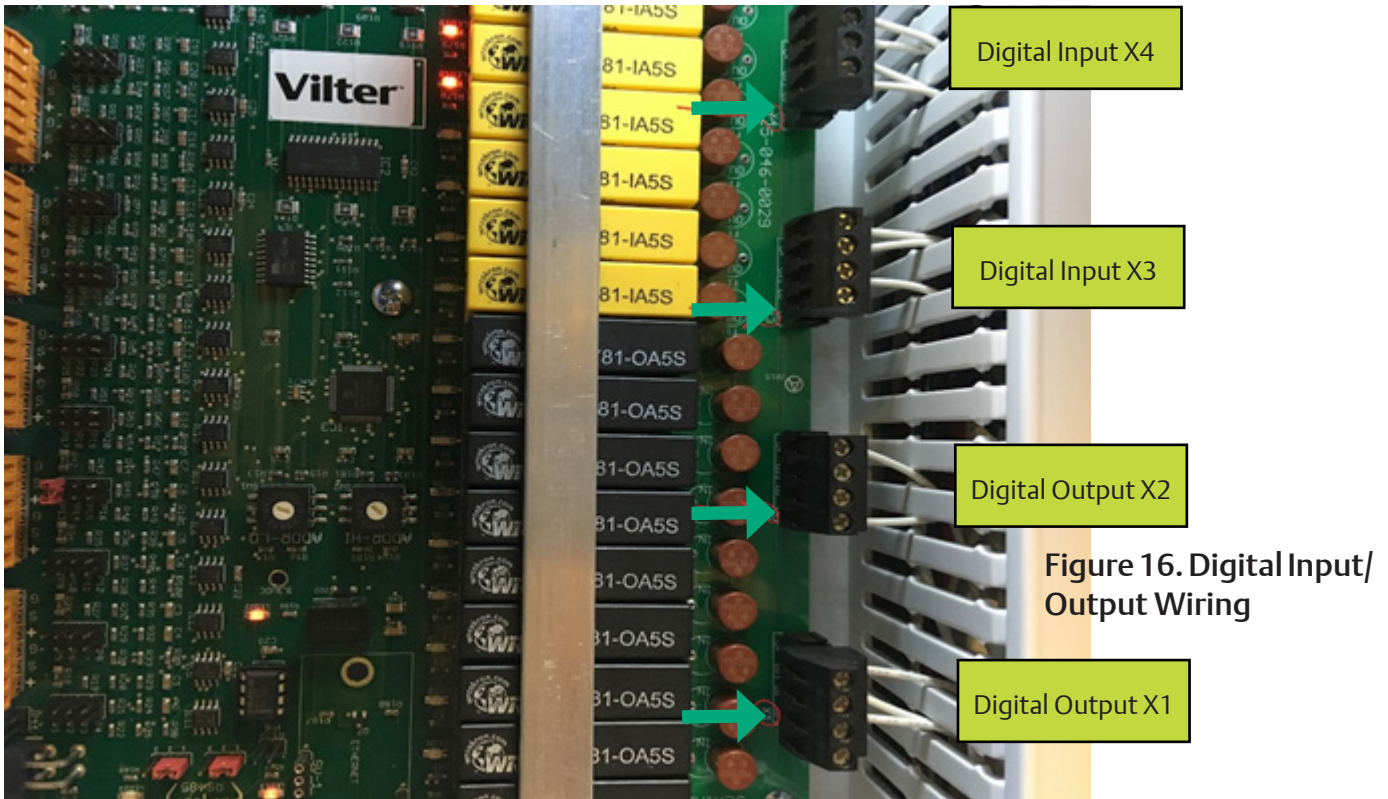
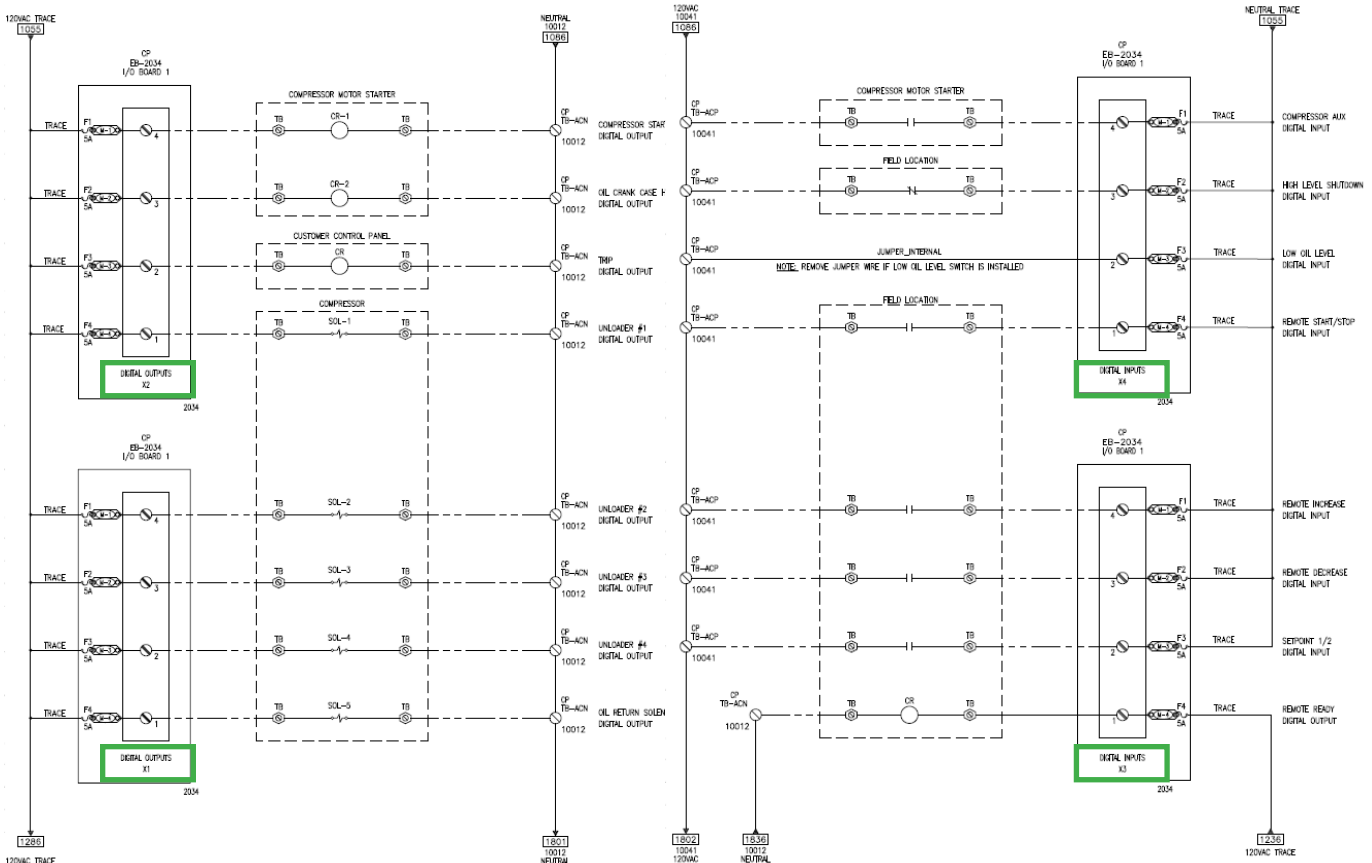


Figure 16. Digital Input/Output Wiring



Step 3. Connecting analog inputs: take a look at the 6 orange screw terminals on the left side of the large multi Input/Output board. The arrows on Figure 17 point to X10 & X9, and the numbers decrease accordingly towards the bottom of the board. These terminals correspond to SHEET 14 of the drawing set.

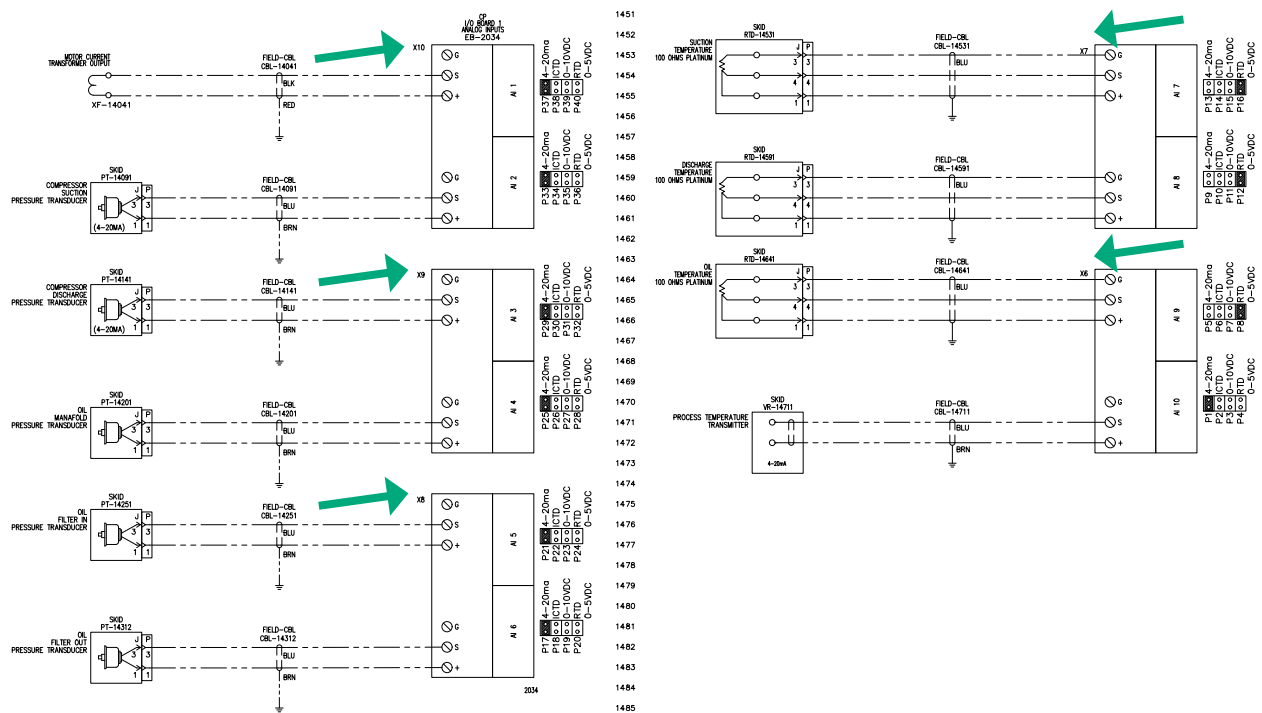


Figure 17. Analog Input Wiring

3.2 Order of Analog Inputs

Wire black Turck cables (provided) from the RTDs to the MicroVission panel following this order:

RTD	Analog Input on I/O Board
Suction Temperature	AI 7
Discharge Temperature	AI 8
Oil Temperature	AI 9

Wire additional inputs to the MicroVission panel following this order:

Accessory	Analog Input on I/O Board
Motor Current Transformer Output	AI 1
Compressor Suction Pressure Transducer	AI 2
Compressor Discharge Pressure Transducer	AI 3
Oil Manifold Pressure Transducer	AI 4
Oil Filter in Pressure Transducer	AI 5
Oil Filter Out Pressure Transducer	AI 6
Process Temperature Transmitter	AI 10

4.0 Read MicroVission Manual

The entire manual should be reviewed before attempting to operate. Failure to follow operating instructions could result in serious injury. Manual revision should match software version.

5.0 Power-up MicroVission and Enter Setpoints

6.0 Pressure Testing and Returning Compressor to Service

Pressure test the pressure transducer connections and install refrigerant back into the compressor and return it to service per plant procedure.

The compressor unit must be checked for leaks after installation to ensure a tight system. For additional leak testing information, refer to Chapter VI of ASME B31.3 Process Piping Code

Refer to your compressor manual for any additional information regarding return to service procedures.

Table 1. Torque Specifications (ft-lbs)

Type Bolt	Head Markings	Nominal Size Numbers or Inches									
		#10	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	3/4"	7/8"
SAE GRADE 2 Coarse (UNC)		-	5	10	18	29	44	63	87	155	150*
SAE GRADE 5 Coarse (UNC)		-	10	19	33	54	78	114	154	257	387
SAE GRADE 5 Coarse (UNF)		-	-	18	-	-	-	-	-	-	-
SAE GRADE 8 Coarse (UNC)		-	11	22	39	63	96	138	191	338	546
Socket Head Cap Screw (ASTM A574) Coarse (UNC)		5	13	26	46	73	112	115	215	380	614

1) Torque values in this table are not to override other specific torque specifications when supplied.

2) When using loctite, torque values in this table are only accurate if bolts are tightened immediately after Loctite is applied.

* The proof strength of Grade 2 bolts is less for sizes 7/8 and above and therefore the torque values are less than smaller sizes of the same grade.

Table 2. MicroVission Kits (1 of 3)

Kit VPN	Items contained	Description	Quantity
KT1133A SUPPORT BRACKETS	1800C	NUT 3/8-16NC HEX STN STL	2
	93LSS	WASHER 3/8 LOCK STN STL 304	4
	93SS1	WASHER 3/8 FLAT STN STL 304	2
	2796CJSS	SCREW 3/8-16NCX1-1/4 CAP HEX 17-4 SS	2
	41813Z	SUPPORT 1/4X3X28 MICROVISSION W/HOLES	2
KT1133A1 PANEL MOUNTING (Retrofit)	93SS1	WASHER 3/8 FLAT STN STL 304	8
	93LSS	WASHER 3/8 LOCK STN STL 304	8
	1800C	NUT 3/8-16NC HEX STN STL	8
	9994ASJ	ISOLATOR 3/8-16 VIBRATION SS STUDS	4
KT1133A3 DECALS (Retrofit)	40680BJ24V	DECAL WARNING NO WIRE RH SIDE PNL 24V	1
	40680BK	DECAL WARNING READ OPERATORS MANUAL	1
	40680BM	DECAL DANGER POSSIBLE ELECTROCUTION	1
	40680BR	DECAL WARNING NO WIRE ON TOP PANEL	1
	1811DESIPAK	DESICCANT TYVEK PACKET	1
	3669SD	CARD SECURE DIGITAL, XGb	1
KT1133A4 ELECTRICAL	3122Q2	CORD GRIP RSR1005 1/2 HUB 1/4 DIA	4
	3122A	CORD GRIP RSR-20732-4 REMKE	2
	2891B	CONNECTOR .187-.312 CORD 1/2 HUB	1
	1652B	HUB 3/4 SCRU-TITE	5
	2748B	BUSHING 3/4X1/2 REDUCING	5
	1242B	LOCKNUT 3/4 CONDUIT	2
	2762B	RING 3/4 SEALING	2
	2763B	BLANK 3/4 KNOCK-OUT SNAP-IN S75	2
KT1133A5 ELECTRICAL FITTINGS/ ACCESSORIES	3122Q2	CORD GRIP RSR1005 1/2 HUB 1/4 DIA	4
	3122G	CORD GRIP RSR-2304-5 REMKE	2
	2891B	CONNECTOR .187-.312 CORD 1/2 HUB	1
	1652B	HUB 3/4 SCRU-TITE	5
	2748B	BUSHING 3/4X1/2 REDUCING	5
	1242B	LOCKNUT 3/4 CONDUIT	2
	2762B	RING 3/4 SEALING	2
	2763B	BLANK 3/4 KNOCK-OUT SNAP-IN S75	2

Table 2. MicroVission Kits (2 of 3)

Kit VPN	Items contained	Description	Quantity
KT1133A7 INSTRUMENTATION	2783D4	TRANSDUCER AKS33 0-200PSIA 4-20MA OUT	4
	13181C	NIPPLE 1/4X2 PIPE SCH80 SMLS	1
	1097B	ELBOW 1/4 90DEG SCRD 3000# CARB STL	1
	2783D2	TRANSDUCER AKS33 0-414.5PSIA 4-20MA OUT	1
	2611G	DETECTOR -58/392F TEMP RESIST W/TURCK	3
	3122L7	CABLE 4M BLACK PLTC ACTUATOR POSITION	8
	3122F	CABLE 3 CONDUCTOR 300V	40
	3122E	CABLE 2 CONDUCTOR DC	15
	41173S6	NAMEPLATE 3/4X2 FILTER OUTLET	1
	41173T6	NAMEPLATE 3/4X2 FILTER INLET	1
	1101A	BUSHING 1/4X1/8 HEXAGON #600	2
	1735A	ELBOW 1/4 90DEG STREET 3000# FORGED	1
KT1133A8 INSTRUMENTATION	2783D4	TRANSDUCER AKS33 0-200PSIA 4-20MA OUT	5
	13181C	NIPPLE 1/4X2 PIPE SCH80 SMLS	1
	1097B	ELBOW 1/4 90DEG SCRD 3000# CARB STL	1
	2783D2	TRANSDUCER AKS33 0-414.5PSIA 4-20MA OUT	2
	2611G	DETECTOR -58/392F TEMP RESIST W/TURCK	4
	3122L7	CABLE 4M BLACK PLTC ACTUATOR POSITION	10
	3122F	CABLE 3 CONDUCTOR 300V	40
	3122E	CABLE 2 CONDUCTOR DC	15
	41173S6	NAMEPLATE 3/4X2 FILTER OUTLET	1
	41173T6	NAMEPLATE 3/4X2 FILTER INLET	1
	1735A	ELBOW 1/4 90DEG STREET 3000# FORGED	1
	1101A	BUSHING 1/4X1/8 HEXAGON #600	2
KT1133A9 BLOCK AND BLEED (Retrofit)	27100D	BRACKET 4HOLE BLOCK/BLEED VERTICAL	1
	2098A	CONN 1/4ODTX1/4FPT BULKHEAD FEM	3
	3031T	VALVE 1/4MPTXFPTXFPT TRANSDUCER	3
	13264B	PLUG 1/4 HEX HD B16.11 SA105	3
	1101A	BUSHING 1/4X1/8 HEXAGON #600	3
	3365G	PLUG 1/8 PLASTIC THREADED	3
	41173T4	NAMEPLATE 3/4X2 SUCTION PRESSURE	1
	41173S2	NAMEPLATE 3/4X2 DISCHARGE PRESSURE	1
	41173B4	NAMEPLATE 3/4X2 OIL PRESSURE	1
	1726E	NUT 1/2-13NC-2B HEX HVY PLAIN	2
	2796EL	SCREW 1/2-13NCX1-3/4 CAP HEX HD GR5	2
	13265G	WASHER 1/2 FLAT BLACK	4
	13165F	WASHER 1/2 LOCK CARB STL	2

Table 2. MicroVission Kits (3 of 3)

Kit VPN	Items contained	Description	Quantity
KT1133A10 BLOCK AND BLEED (Retrofit)	27100D	BRACKET 4HOLE BLOCK/BLEED VERTICAL	1
	2098A	CONN 1/4ODTX1/4FPT BULKHEAD FEM	4
	3031T	VALVE 1/4MPTXFPTXFPT TRANSDUCER	4
	13264B	PLUG 1/4 HEX HD B16.11 SA105	4
	1101A	BUSHING 1/4X1/8 HEXAGON #600	4
	3365G	PLUG 1/8 PLASTIC THREADED	4
	41173T4	NAMEPLATE 3/4X2 SUCTION PRESSURE	1
	41173B4	NAMEPLATE 3/4X2 OIL PRESSURE	1
	41173X6	NAMEPLATE 3/4X2 DISCHARGE PRESS #1	1
	41173Y6	NAMEPLATE 3/4X2 DISCHARGE PRESS #2	1
	1726E	NUT 1/2-13NC-2B HEX HVY PLAIN	2
	2796EL	SCREW 1/2-13NCX1-3/4 CAP HEX HD GR5	2
	13265G	WASHER 1/2 FLAT BLACK	4
	13165F	WASHER 1/2 LOCK CARB STL	2
KT1133A11 MOUNTING SUPPORT	A41813M	SUPPORT 2-16CYL CONTROLLER MICROVISSION	1
	13265K	WASHER 3/4 FLAT BLACK	8
	1726H	NUT 3/4-10NC-2B HEX HVY PLAIN	4
	2796HQ	SCREW 3/4-10NCX2-3/4 CAP HEX HD GR5	4
KT1133A12 PROCESS TEMP RTD, WELL & CABLE	2611G	DETECTOR -58/392F TEMP RESIST W/TURCK	1
	3122L7	CABLE 4M BLACK PLTC ACTUATOR POSITION	1
	2611J	WELL 1/4X1/2 RTD LAGGING 1018CS	1
KT24x20MV KIT 24X20	A42159A	PANEL 20X24 MICROVISSION 2-8CYL	1.00
	KT1133A11	KIT MOUNTING SUPPORT	1.00
	KT1133A1	KIT PANEL MOUNTING MICROVISSION RETRO	1.00
	KT1133A8	KIT INSTRUMENTATION MICROVISSION RETRO	1.00
	KT1133A5	KIT ELECTRICAL FITTINGS/ACCESSORIES	1.00
	2611F	WELL 1/4X1/2 RTD 1018CS	4.00
	2611N	DETECTOR -58/122DEG TEMP RESIST 4-20MA	1.00
	2611F	WELL 1/4X1/2 RTD 1018CS	1.00
	3122L7	CABLE 4M BLACK PLTC ACTUATOR POSITION	1.00
	KT1133A10	KIT BLOCK AND BLEED MICROVISSION RETRO	1.00
	A42159A	PANEL 20X24 MICROVISSION 2-8CYL	1.00
	3669CT	TRANSMITTER MOTOR CURRENT	1.00
KT822A MOUNTING HARDWARE	1726D	NUT 7/16-14NC-2B HEX HVY PLAIN	2.00
	13265FZ	WASHER 7/16 USS ZINC PLTD	4.00
	13165ES	WASHER 7/16 LOCK 304SS	2.00
	41801G	BRACKET, CONTROL PANEL RETROFIT	1.00

