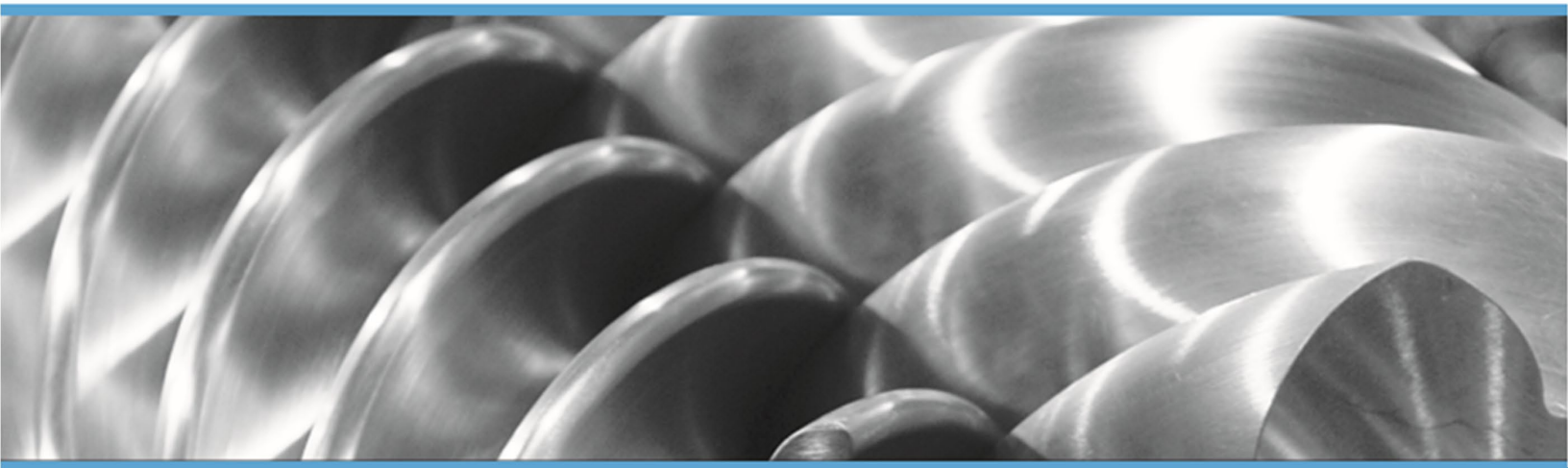
ROGERS®

Rotary Screw Air Compressors

ECOPAK



Description of Operation / Display & Controls

Model #: _____ **Serial #:** _____

KI Series

Fixed Speed or Variable Speed ■ Lubricant-Injected
■ Single-Stage ■ 10 – 100 HP ■ Air-Cooled ■ 100 – 175 PSIG

rogers-kseries.com

KI_Desc-of-Ops_0_REV1
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SAFETY PRECAUTIONS

READ AND UNDERSTAND THE CONTENTS OF THIS MANUAL BEFORE INSTALLING, OPERATING OR MAINTAINING THIS COMPRESSOR.

Failure to follow any of these precautions may result in severe personal injury, death, property damage and / or compressor damage.

Electricity and compressed air are dangerous. When performing maintenance or service work, make absolutely sure the electrical supply is disconnected and locked out. The discharge air line service valve (customer furnished) must be closed and the compressor relieved of all internal pressure. DO NOT rely on the discharge air line check valve for safety when working on any compressor system or component. Verify the specific section is depressurized prior to entering the system.

Air from this compressor will cause severe injury or death if used for breathing or food processing without adequate filtering and monitoring to meet OSHA: 29 CFR 1910.134 or FDA21 CFR 178.3570 regulations. The manufacturer does not recommend this compressor for use as breathing air.

Disconnect and lockout all power supplies to the compressor plus any remote controllers prior to servicing the unit.

Periodically confirm that all safety and shutdown devices are operating properly.

Do not allow flammable, toxic or corrosive gases to enter the air inlet system or electrical devices.

Do not override or remove any safety or shutdown device

Make certain all associated pipe and equipment beyond this compressor is compatible with maximum pressures and temperatures to be encountered during normal and adverse operation. Do not use plastic pipe in the compressed air system.

Never assume it is safe to work on the unit because it is not operating, many compressors are equipped with automatic start - stop devices. THIS MACHINE MAY START AT ANY TIME.

When testing or operating the compressor, hearing and eye protection is required.

When in operation the surface temperatures of the compressor components may become hot enough to burn skin. Use caution and protective clothing as required.

Only Authorized & Trained Technicians are allowed to adjust set points. Follow all maintenance procedures and check all safety devices on schedule. Use the correct fluid at all times.

Please ensure adequate space around the compressor unit for ease of service. Follow all local codes for set-back requirements.

When wiring, please separate the POWER and CONTROL lines to reduce the electromagnetic interference.

PREFACE

The Rogers KI Series rotary screw air compressors use the axial flow screw principle, and control of this air compressor is accomplished by the Control Display Panel (CDP) which includes the normal functions of starting, stopping, loading and unloading the compressor. In addition, the CDP monitors the critical functions of the compressor, creates alerts and shuts down the unit if needed. Maintenance hours and many other details are maintained by the CDP. Please read and understand this manual before installing or operating this compressor. Occasionally refer back to this manual for additional information and features which you might have overlooked the first time through.

For clarity the following terms are used throughout this document;

Alert Compressor needs attention but has not shut down. For instance, a High Temperature Alert would indicate the compressor could be running hot and shut down is imminent. Alerts are also used to indicate service is required.

Alarm Compressor has shut down. Refer to the FAULT HISTORY.

NOTE

Check motor rotation prior to starting up equipment. Incorrect rotation will cause serious damage to the compressor bearings and rotors. See Operations and Maintenance Manual for rotation information.

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1.0 BASIC OPERATION OF CONTROL DISPLAY PANEL (CDP)

1.1 Description of buttons

FIGURE 1

- Start: Starts the compressor

- Stop: Stops the Compressor. Use this button for normal stopping of the compressor. Do not use the Emergency stop button for normal stopping

- Set: Confirm the input to be saved after changing setting.

- Up: Scroll upward, add value, select menu during the menu selection.

- Down: Scroll downward, subtract value, select menu during the menu selection.

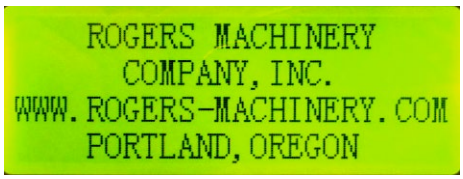
- Cursor/Confirm: Can be used as cursor. Move cursor through selection. Also (enter) button during the menu selection.

- Manual loading / Unloading: This button is used to load and unload the machine

- Return / Reset: Return to prior set points menu. Also resets the machine when depressed for five (5) seconds to reset after a failure.

1.2 Display Operations

The START UP PAGE is shown when the compressor is powered on for five (5) seconds:



Start Up Page

After five (5) seconds the MAIN PAGE (below) will be shown.

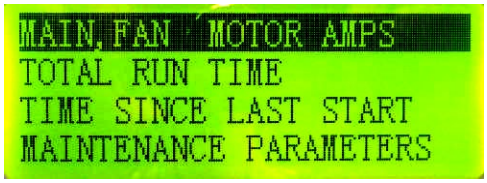
Main Page

The following instructions describe how to navigate the CDP display.

Press  or  to move the highlighted menu cursor up or down. Press  to select the following menu selection interface.

1.2.1 Operating Parameters Review

Press  or  to move the cursor up or down. Once the “Operating Parameters” is highlighted, then press  to open the second level submenu as shown below:



Press  to open the third level submenu:

If the submenu opened is the last menu level; the cursor will disappear. Press the ESCAPE button C and return to the higher level menu. If the operation is stopped at a certain interface, it will automatically return to the main menu after several seconds.

Use the DOWN and UP buttons ▽, △, the RIGHT (confirm) button ▷ the ESCAPE button C to view the RUN PARAMETERS such as the CURRENT, RUN TIME, MAINTENANCE PARAMETERS, HISTORY, FAILURE, MFG DATE, SERIAL NUMBER and CURRENT FAILURES and then return to the upper menu with the similar method as above.

1.2.2 Calendar and Time

Press ▽ or △ to move the dark cursor to the CALENDAR menu and then press ▷ to confirm, the following menu will display:

The date and time can be adjusted according to the following steps:

Press ▽ or △ to move the cursor to the parameters which you want to modify and then press ▷ to reach the blinking position. Now the button ▽ and △ act as “Page-up” and “Page-down” buttons. Press “S” button to confirm and save the data after the modification. The buttons ▽ or △ return to be black cursor moving buttons.

1.2.3 OPERATING PARAMETERS, FUNCTIONS and DISPLAY

First Submenu	Second Submenu	Third Submenu			Description
Main, Fan Motor Amps	CUR(A)	U	V	W	Displays amps for main motor and fan motor.
	MAIN MOTOR:	0.0	0.0	0.0	
	FAN MOTOR:	0.0	0.0	0.0	
	OIL SUMP TEMP:	75 °F			Displays temperature of the oil sump.
Total Run Time	TOTAL RUN TIME:	000010 H 50 M			Displays total run hours and total loaded hours.
	TOTAL LOADED TIME:	000008 H 40 M			
Time Since Last Start	TIME SINCE LAST START:	000000 H 00 M			Displays time since last start and time since last loaded.
	TIME SINCE LAST LOADED:	000000 H 00 M			
Maintenance Parameters	ELAPSED TIME / INTERVAL	Displays hours since last service and the normal number of hours between services. A service alert will occur when the service interval is exceeded. *Note:* The service intervals shown are for a "clean" environment installation. The start up technician may lower the service interval to ensure proper maintenance of the air compressor.			
	OIL FILTER: 0010/2000				
	A-0 SEPARATOR: 0010/6000				
	AIR FILTER: 0010/2000				
	LUBRICANT: 0010/6000				
	MOTOR GREASE: 0010/2000				
Fault History	PHASES REVERSED 04-13-2016 WEDNESDAY 12:15:02				Displays last eight (8) faults with date and time.
Production Information	MFG DATE: 09-01-2015				Displays manufacturing date and serial number.
	SERIAL NUMBER: 06520247				
Last Fault	NO FAULT				Displays last fault.

1.2.4 CALENDAR

First Submenu	Second Submenu	Description
Current Time	06-17-2016 FRIDAY 11:.04:55	Displays current time and date. Allows user to change time and date.

1.2.5 CUSTOMER PARAMETERS AND FUNCTIONS

First Submenu	Second Submenu	Third Submenu	Description
Set Pressure and Temperature	Load Pressure	100 PSIG	LOADING PRESSURE VALUE (typical)
	Unload Pressure	110 PSIG	UNLOADING PRESSURE VALUE (typical)
	Fan start T.	60 °F	Cooling fan starting temperature. The cooling fan on the KI units run continuously. Initially set at 60 °F.
	Fan stop T.	60 °F	Cooling fan stopping temperature. The cooling fan on the KI units run continuously. Initially set at 60 °F.
Set Start / Stop Delay	Motor Start Delay	0008s	The KI interface uses the controller to protect the main motor. This overload protection is bypassed for the number of seconds inputted here. The MOTOR START DELAY should be set as short as practical but must be longer than the WYE-DELTA DELAY time plus the LOAD DELAY TIME.
	Fan Start Delay	0006s	The KI interface uses the controller to protect the fan motor, it is required that the time set here will not allow the motor to exceed the starting current.
	Star Delta (Y-Δ) Transition Time	0006S	Star-Δ transition timer. (seconds)
	Load Delay Time	0002S	The loading delay time after Y-Δ transition has finished. (seconds)
	Unload Stop Delay	0020M	Standby delay in minutes. The compressor will run unloaded for this value before stopping and placing itself in Standby. The compressor will restart automatically if the system pressure drops below the LOAD PRESSURE set point.
	Stop Delay Time	0045S	Count down timer. When the stop button is pressed the compressor will unload and run for this number of seconds before stopping. Ensures the separator tank is fully blown down before stopping. Typically set for 30 – 59 seconds.
	Restart Delay Time	030S	Count down timer. Once stopped the compressor can not be started until this number of seconds has passed.
	Drain open time	0002S	If an optional condensate valve is provided, the drain valve will open for this many seconds.
	Drain close time	0010M	If an optional condensate valve is provided, the drain valve will remain closed for this

First Submenu	Second Submenu	Third Submenu	Description
			many minutes.
Operating Mode	ON/OFF Mode	Local/Remote	Local Mode – local start button will start the compressor. Remote Mode – local start button and a remote contact closure will start the machine.
	Load Mode	Auto/Manual	Auto Mode – the compressor will unload and reload per the set points Manual Mode – the Load/Unload function can only be executed by pressing buttons.
	Com Mode	Computer/ Prohibit/Block	When this is set as 'PROHIBIT" the communication function is not available.
	Com Address	0255	Communication address
Lead / Lag Mode	Lead / Lag Status	Lead/Lag	Sets Machine as either Lead or Lag. For more than two (2) compressors see Network control.
	Lead/Lag	Alone/Alternate	Sets compressors to alternate automatically or manually.
	Alternate Time	0168 hours	Number of hours between automatic alternation of two (2) compressors in Lead Lag
	Multi Machine #	0016	When using Network control with multiple more than two (2) compressors this value is the total number of compressors in the network.
	Lag Load Press	90 PSIG	Lag compressor will remotely load at this set point.
	Lag Unload Press	105 PSIG	Lag compressor will remotely unload at this set point
	Restart Delay	30S	Lag compressor will delay restarting by this number of seconds
Reset Maintenance Alarm	Oil Filter Service Due	0000 hours	Time since last service reset
	A-O Sep Service Due	0000 hours	Time since last service reset
	Air Filter Service Due	0000 hours	Time since last service reset
	Lubricant Service Due	0000 hours	Time since last service reset
	Motor Grease Service Due	0000 hours	Time since last service reset
	HI Temp Alert	221 °F	Alert - Air compressor is operating near the shutdown temperature
	HI Temp Trip	235 °F	Alarm - Air compressor shut down because it was operating at or above this temperature.
	Oil Sump Temperature Alarm	235 °F	Alarm - Air compressor shut down because it was is operating at or above this temperature.

Submenu	Second Submenu	Third Submenu	Description
Set Maintenance Intervals	Oil Filter	2000 hours	Number of hours until service alert occurs. If set to “0”, oil filter service alert is disabled.
	Air-Oil Separator Element	6000 hours	Number of hours until service alert occurs. If set to “0”, air – oil separator service alert is disabled.
	Air Filter	2000 hours	Number of hours until service alert occurs. If set to “0”, air filter service alert is disabled.
	Lubricant	6000 hours	Number of hours until service alert occurs. If set to “0”, lubricant change service alert is disabled.
	Motor Grease	2000 hours	Number of hours until service alert occurs. If set to “0”, motor grease service alert is disabled.
User Password Modification		6151	Password set at factory.
Language Display		English/Chinese	Set to ENGLISH.

1.2.6 FACTORY PARAMETERS (for information only)

In general, FACTOR PARAMETERS are visible, however, they should not be changed without contacting the factory. The main functions of the parameters are as the following table.

Parameter	Initial Value	Description
Motor Rated Current	MAXIMUM OVERLOAD VALUE OF THE MOTOR x 1.2	After the starting delay time, when the motor current is greater than 1.2 times of the set value and less than 4 times of the set value, the unit will fault (alarm and shutdown) as per overload feature. See technical manual for other options
Fan Rated Current	Max. allowable motor overload value x 1.2	Same as above.
AUX Temperature	N/A	Not Used.
AUX Temperature	N/A	Not Used.
High Press Alarm and shut down	165 PSI	Alarm (shut down) when the discharge air pressure reaches this set point.
High Press Unload	135 PSI	Upper limit for the Unload pressure set point. Unload set point must be set lower than this value.
Set Load Time	**** hours	Modify the load running time hour meter.
Set Run Time	**** hours	Modify the total running time hour meter.
Fault History Pass	****	Input the history failure password to clear all the history failures.
Current Unbalance	0006	When (the max. phase current / min. phase current) is greater than (1+set value), the unbalance protection will stop the machine. If the set value is greater than 15, the unbalance protection will be disabled. Factory disabled
Phase Protection Delay	2.0 sec	The Phase Protection feature is bypassed for this many seconds after the start button is pushed. If set for more than 20 seconds this feature is permanently disabled. Typically set for 2-5 seconds.
Production Date	****Y**M**D	Date unit was manufactured.
Serial Num	********	Serial number of the unit.
Voltage Limit High	0000V	When voltage is detected higher than VOLTAGE LIMIT HIGH, the controller will alarm and stop. When set as 0000, VOLTAGE LIMIT HIGH protection function is not activated.
Voltage Limit Low	0000V	When voltage is detected lower than VOLTAGE LIMIT LOW, the controller will alarm and stop. When set as 0000, VOLTAGE LIMIT LOW protection function is not activated.
FREQ SELECT	60 HZ	Set the power frequency.

Parameter	Initial Value	Description
Alarm Stop Delay	0000 H	When controller detects oil filter, air filter, O/A separator lubricant and grease running over the max time and alarm over the set time, compressor will alarm and stop. (Set this Value to 0000 to Disable).
Interface	Rogers	Do not change.
Low Temp Protect	5 °F	After power on, if the temperature is detected lower than the set value, it is not allowed to start. Two minutes after power on, if the temperature is still detected lower than the set value the machine will display a temperature sensor fault and will not start.
Start Password	0000	After energized, the controller can start the compressor only by inputting this password. When set as 0000, no password is needed to start the compressor.

2. CONTROL PRINCIPLE (Refer to the typical electrical schematics below)

2.1 KI 10-100 HP UNITS – LOAD / UNLOAD CONTROL

2.1.1 Standard Components

A. Inlet valve – controls incoming air from the air filter to the compression element.

B. Solenoid control valve – either a 2-way or 3-way solenoid which directs control air from the sump to the inlet valve actuator.

C. 3 – way control check valve directs control air and control air exhaust

D. Bleed valve – needle valve to regulate the amount of sump air pressure being bled back to atmosphere. Used to control sump pressure when the compressor is unloaded.

E. By-pass valve (on some units)

2.1.2 Manual starting and stopping of the compressor

A. Press "  " to start: (Y—△ Starting)

B. When the controller is powered on, it will perform a three (3) second self-check. After self check is complete press the "  " button to start the compressor. The compressor will run through the Y-Δ start sequence.

C. When the motor has finished its Y-△ start and is turning at full speed the compressor will be unloaded until the load delay count down timer reaches zero. The load delay timer is typically set for 30 seconds. During this period the unloading valve solenoid is de-energized, and the inlet valve remains closed.

D. Once the load delay timer has counted down to zero (0) the compressor will load.

E. Note: KI-10 compressors have an across–the-line starter and start with full voltage.

2.1.3 KI 10-20 HP Automatic Loading / Unloading (D10427 Inlet Valve)

A. The standard operating mode of the KI 10-20 HP units is load / unload. The load and unload set points are set in the controller and are adjustable. Typically, the difference between the load / unload set points is 10 psi. The sensing point is located on the package discharge line downstream of the aftercooler.

B. Before start up, the system pressure is zero (0) psig, the solenoid control valve is de-energized and is its Normally Open state. The control pressure is zero, the actuator piston is retracted by the stronger spring, and the inlet valve is extended by the weaker

spring such that the inlet valve rests against the seat. The inlet valve is closed (see figure 2).

C. During start up, the rotors begin to turn and pull a slight vacuum at the compressor inlet downstream of the inlet valve. The vacuum is strong enough to collapse the weaker spring and retract the inlet actuator and valve thus allowing air into the compressor and compression begins. In addition, discharge air pressure is most likely below the LOAD PRESSURE set point and the solenoid control valve is energized (closes) and the compressor is loaded.

D. The compressor and separator system come up to the minimum pressure valve pressure setting (approximately 60 psig) rather quickly at which point the minimum pressure valve opens and lets air into the aftercooler and out to the air system while keeping the back pressure on the separator system at a minimum of 60 psig. Keeping a minimum back pressure on the separator system and sump helps the oil / air separation process and creates the differential motive force to move the oil through the compressor.

E. As the system pressure rises system pressure is below the LOAD PRESSURE set point and the compressor remains loaded. At discharge pressures below the LOAD PRESSURE set point (e.g.100 PSIG) the solenoid unloading valve is energized (closed), the control air pressure is zero and the compression spring in the actuator is retracted allowing the inlet valve to be in the fully open position. The compressor is loaded producing air.

F. When the UNLOAD PRESSURE set point is reached (e.g. 110 PSIG) the solenoid unloading valve is de-energized which allows control air from the sump into the inlet valve actuator and the inlet valve is closed, unloading the compressor.

G. There is a “bleed” valve which releases some control air back to atmosphere (through the suction side of the inlet valve) to help control the residual air pressure level in the sump (typically 30-40 psig).

H. The unloading check valve also shifts position when the compressor is unloaded which in turn allows a portion of the control air to flow from the sump back to the downstream side of the check valve to be recompressed. This “by-passed” air is what maintains residual air pressure in the sump.

I. The net affect is the unloading solenoid valve, when de-energized (open) allows control air to close the inlet valve almost completely. Sump air is dumped to atmosphere and sump pressure falls to approximately 30-40 psig.

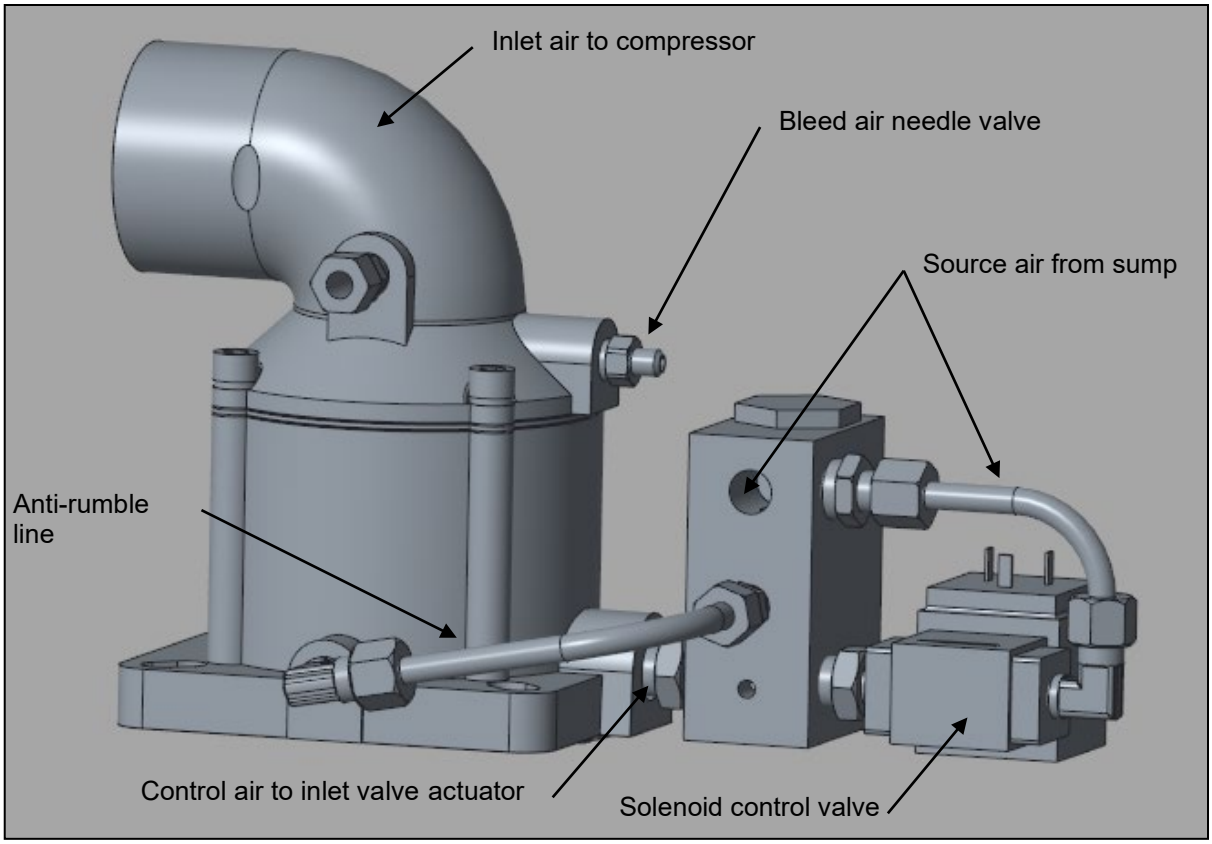
J. As sump pressure falls the discharge check valve closes and isolates system pressure from the air compressor.

K. When the system pressure falls to the LOAD PRESSURE set point (e.g. 100 psig) the solenoid unloading valve is energized (closes). Control air to the inlet valve is cut off. The small amount of control air downstream of the solenoid valve quickly drains out through the “bleed” valve and the compressor inlet valve opens and compression begins again. The inlet check valve shifts back closing the “by-pass” line around inlet valve.

L. If after running unloaded for UNLOAD STOP DELAY period the compressor motor will stop. Typically, the UNLOAD STOP DELAY is set at 15-20 minutes to ensure the compressor will not start too often.

M. The compressor will be in standby mode ready to start automatically if the discharge pressure drops to the LOAD PRESSURE SET POINT.

Figure 2
D10427 - Inlet Valve



KI & KIV 10 - 20

2.1.4 KI 25 & 30 HP Automatic Loading / Unloading (D10438 Inlet Valve)

A. The standard operating mode of the KI 25 & 30 HP units is load / unload. The load and unload set points are set in the CDP and are adjustable. Typically, the difference between the load and unload set points is 10 psi. The sensing point is located on the package discharge line downstream of the aftercooler. The solenoid control valve is a 3 – way valve with an integral check valve. The three (3) pneumatic ports are labeled; 1, 2, and source.

B. Before start up, the system pressure is zero (0) psig, the solenoid control valve is de-energized, ports 1 and source are connected. The control pressure is zero, the actuator piston is retracted by the stronger spring, and the inlet valve is extended by the weaker spring such that the inlet valve rests against the seat. The inlet valve is closed (see figure 3).

C. During start up, the rotors begin to turn and pull a slight vacuum at the compressor inlet downstream of the inlet valve. The vacuum is strong enough to collapse the weaker spring and retract the inlet actuator and valve thus allowing air into the compressor and compression begins. In addition, discharge air pressure is most likely below the LOAD PRESSURE set point and the solenoid control valve is energized. The source port is closed and ports 1 and 2 are connected which exhausts the control air that was holding the inlet valve closed and the compressor is loaded.

D. The compressor and separator system come up to the minimum pressure valve setting (approximately 60 psig) rather quickly at which point the minimum pressure valve opens and lets air into the aftercooler and out to the air system while keeping the back pressure on the separator system at a minimum of 60 psig. Keeping a minimum back pressure on the separator system and sump helps the oil / air separation process and creates the differential motive force to move the oil through the cooler, oil filter and back to the compressor.

E. As the system pressure rises and system pressure is below the LOAD PRESSURE set point, the compressor remains loaded. At discharge pressures below the LOAD PRESSURE set point (e.g.100 PSIG) the solenoid control valve is energized, and the compressor remains loaded.

F. When the UNLOAD PRESSURE set point is reached (e.g. 110 PSIG) the solenoid control valve is de-energized which allows control air from the sump (source port) into the inlet valve actuator (port 1) and the inlet valve is closed, unloading the compressor. Port 2 (exhaust) port is closed preventing control from escaping.

G. The inlet valve contains three (3) small orifices which allow a small amount of atmospheric air into the compressor for compression.

There is a flapper style check valve covering these orifice on the downstream side of the inlet valve which closes during shut down to prevent back spinning and oil being discharged into the air filter element. To control the sump, blow down time and residual sump pressure there is a bleed valve which releases sump air back to the compressor inlet. The bleed valve is set such that the sump pressure eventually drops to 30-40 psig and stays there.

H. The net affect is the solenoid control valve, when de-energized (source and port 1 are connected) allows control air to close the inlet valve. The by-pass orifices bleed a small amount of air around the closed inlet valve. Sump air is dumped to atmosphere and sump pressure falls to approximately 30-40 psig.

I. As sump pressure falls the discharge check valve closes and isolates system pressure from the air compressor.

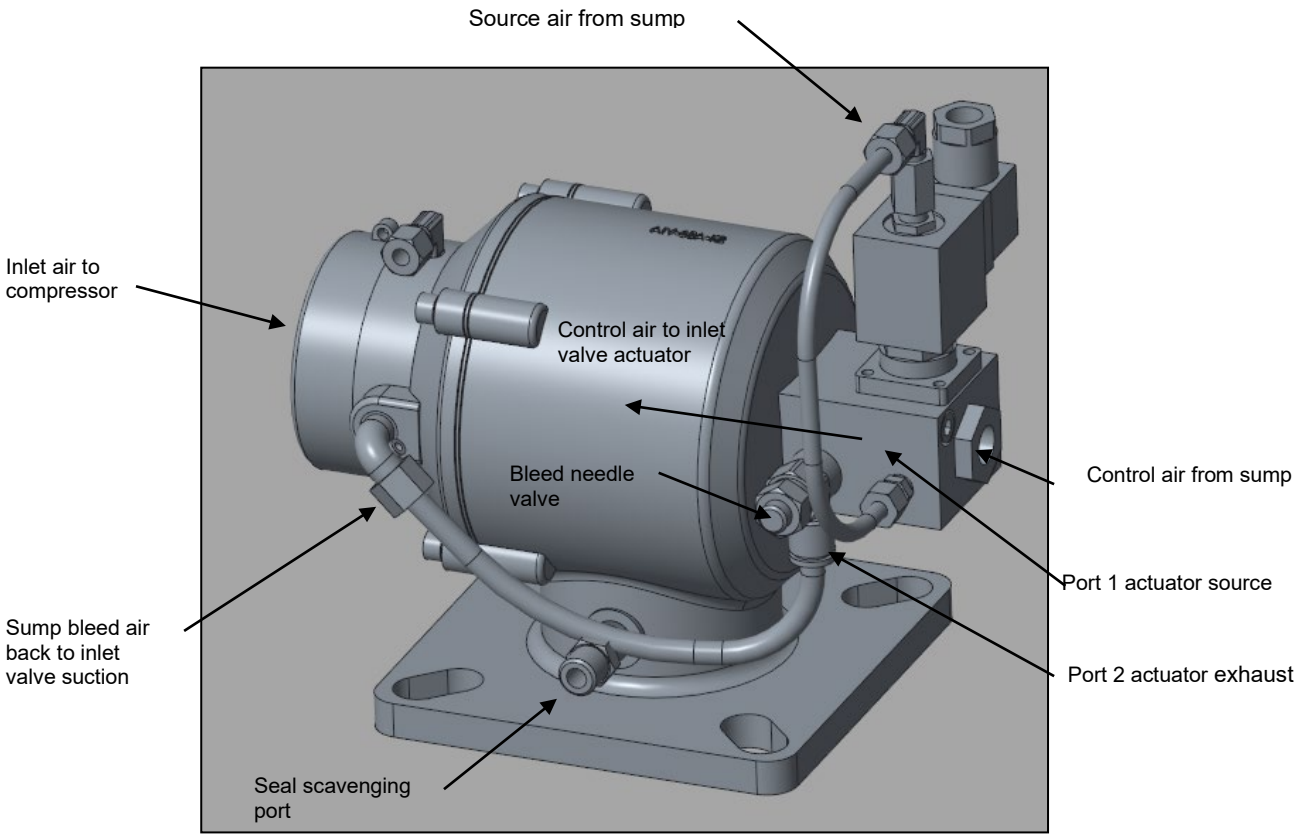
J. If after running unloaded for the UNLOAD STOP DELAY period the compressor motor will stop. Typically, the UNLOAD STOP DELAY is set at 15-20 minutes to ensure the compressor will not start too often.

K. If the compressor stops in this manner it will be in standby mode ready to start automatically if the discharge pressure again drops to the LOAD PRESSURE SET POINT.

L. When the system pressure falls to the LOAD PRESSURE set point (e.g. 100 psig) the compressor will load, start if necessary. The solenoid control valve is energized (Port 1 and port 2 are connected and the source port is closed) the control air signal is removed and the compressor loads.

M. Typically, the compressor loads and unloads as directed by the CDP to maintain system pressure between the LOAD PRESSURE SET POINT and the UNLOAD PRESSURE SET POINT.

Figure 3
D10438 - Inlet Valve



KI & KIV 25-30

2.1.5 KI 40-60 HP Automatic Loading / Unloading (D9791 - Inlet Valve)

A. The standard operating mode of the KI 40 - 60 HP units is load / unload. The load and unload set points are set in the CDP and are adjustable. Typically, the difference between the load and unload set points is 10 psi. The sensing point is located on the package discharge line downstream of the aftercooler. The solenoid control valve is a two – way valve. Source air is from the sump and the outlet control air feeds the inlet actuator and the anti-rumble check valves.

B. Before starting up, the system pressure is zero (0) psig, the solenoid control valve is de-energized, and the valve is open. The control pressure is zero, the actuator piston is retracted by the stronger spring, and the inlet valve is extended by the weaker spring such that the inlet valve rests against the seat. The inlet valve is closed (see figure 4).

C. During start up, the rotors begin to turn and pull a slight vacuum at the compressor inlet downstream of the inlet valve. The vacuum is strong enough to collapse the weaker spring and retract the inlet actuator and valve thus allowing air into the compressor and compression begins. In addition, discharge air pressure is most likely below the LOAD PRESSURE set point and the solenoid control valve is energized, closed and the inlet valve is open, and the compressor is loaded.

D. The compressor and separator system come up to the minimum pressure valve setting (approximately 60 psig) rather quickly at which point the minimum pressure valve opens and lets air into the aftercooler and out to the air system while keeping the back pressure on the separator system at a minimum of 60 psig. Keeping a minimum back pressure on the separator system and sump helps the oil / air separation process and creates the differential motive force to move the oil through the cooler, oil filter and back to the compressor.

E. As the system pressure rises and system pressure is below the LOAD PRESSURE set point, the compressor remains loaded. At discharge pressures below the LOAD PRESSURE set point (e.g.100 PSIG) the solenoid control valve is energized, and the compressor remains loaded.

F. When the UNLOAD PRESSURE set point is reached (e.g. 110 PSIG) the solenoid control valve is de-energized which allows control air from the sump into the inlet valve actuator and the inlet valve is closed, unloading the compressor. The control air also feed the two (2) anti-rumble lines and the sump blow down.

G. The inlet valve seals tight, but the bypass valve allows a small amount of atmospheric air into the compressor for compression. There is an internal shuttle valve which closes this by-pass port

during shut down to prevent compressor back spinning and oil being discharged into the air filter element. To control the sump, blow down time and residual sump pressure the bypass valve is adjustable, however it should require little adjustment as it is set at the factory such that sump pressure eventually drops to 30-40 psig and stays there.

H. The net affect is the solenoid control valve de-energizes and opens to allow control air to close the inlet valve. The integral bypass valve bleeds a small amount of air around the closed inlet valve. Sump air is dumped to atmosphere and sump pressure falls to approximately 30-40 psig.

I. As sump pressure falls the discharge check valve closes and isolates system pressure from the air compressor.

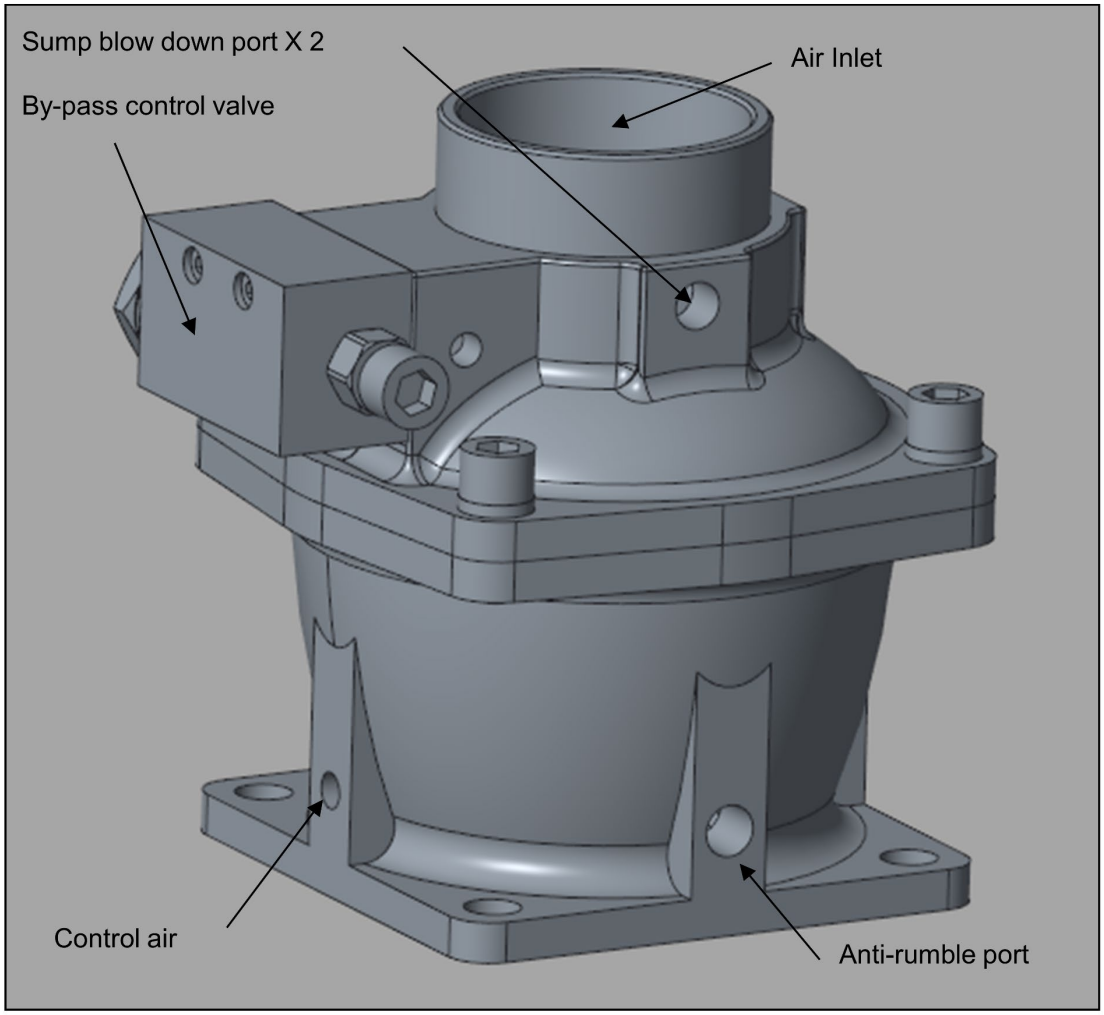
J. If after running unloaded for the UNLOAD STOP DELAY period the compressor motor will stop. Typically, the UNLOAD STOP DELAY is set at 15-20 minutes to ensure the compressor will not start too often.

K. If the compressor stops in this manner it will be in standby mode ready to start automatically if the discharge pressure again drops to the LOAD PRESSURE SET POINT.

L. When the system pressure falls to the LOAD PRESSURE set point (e.g. 100 psig) the compressor will load, start if necessary. The solenoid control valve is energized, and the control air signal is removed and the compressor loads.

M. Typically, the compressor loads and unloads as directed by the CDP to maintain system pressure between the LOAD PRESSURE SET POINT and the UNLOAD PRESSURE SET POINT.

Figure 4
D9791 - Inlet Valve



KI (V) 40 - 60 HP

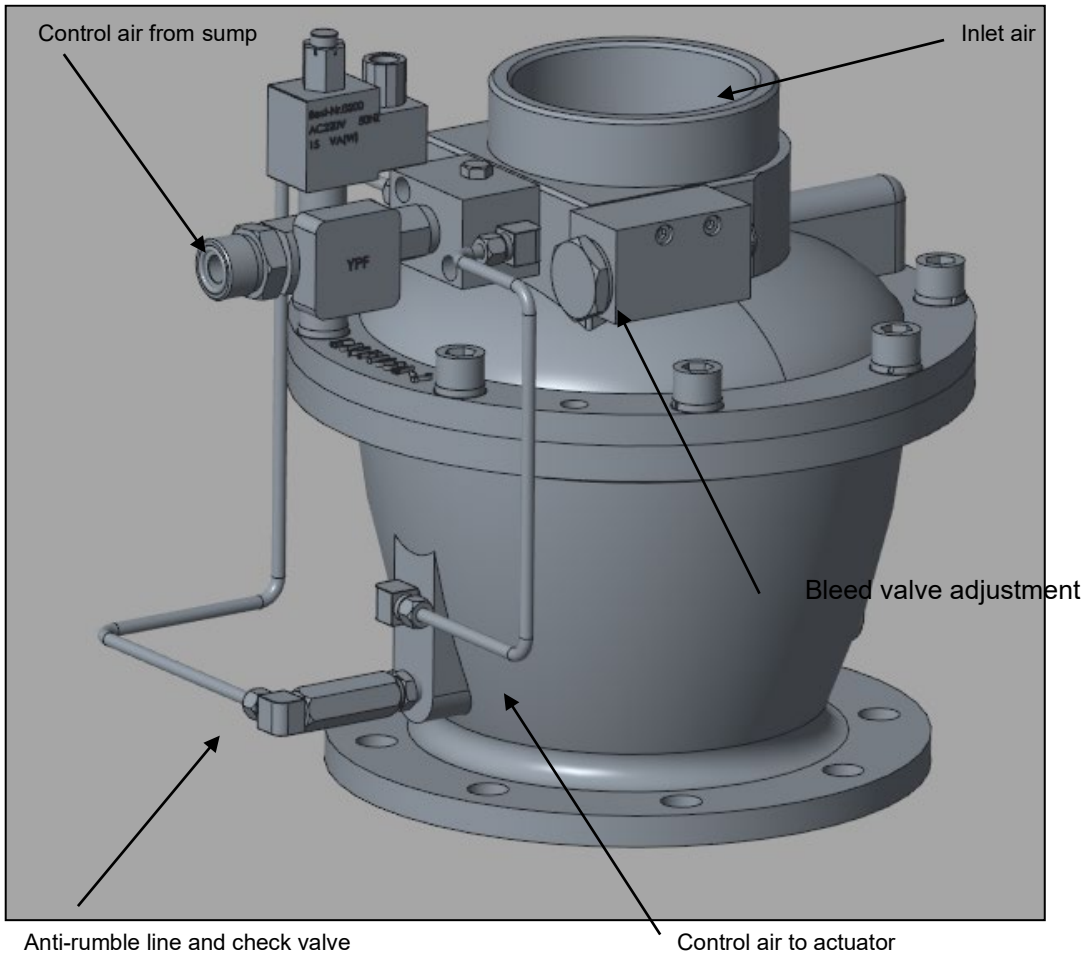
2.1.6 KI 75 HP Automatic Loading / Unloading (D10779 – Inlet Valve)

A. The standard operating mode of the KI 75 HP unit is load / unload. The load and unload set points are set in the CDP and are adjustable. Typically, the difference between the load and unload set points is 10 psi. The sensing point is located on the package discharge line downstream of the aftercooler. The solenoid control valve is a two – way valve. Source air is from the sump and the outlet control air feeds the inlet actuator and the anti-rumble check valves.

B. The operation of the KI 75 inlet valve is identical to the smaller valve on the KI 40-60 HP units, except the blow line from the outlet of the solenoid to the upstream side of the inlet valve is ported internally. There is no external blow down line on this valve. See figure 5

Figure 5

D10779 - Inlet Valve



KI-75

2.1.7 KI 100 HP Automatic Loading / Unloading (D10779 – Inlet Valve)

A. The standard operating mode of the KI 100 HP unit is load / unload with a pilot valve for modulation. To use load / unload close the pilot shut off valve to de-activate the pilot valve. Opening the pilot shut off valve will activate the pilot valve and the compressor will be loaded with inlet modulation.

B. Modulation control is detailed in section 2.1.8 below.

C. The load and unload set points are set in the CDP and are adjustable. Typically, the difference between the load and unload set points is 10 psi. The sensing point for loading and unloading is located on the package discharge line downstream of the aftercooler. The solenoid control valve is a two – way valve. Control air comes from the sump, to the solenoid, then to the control air manifold. The manifold disperses the control air to the inlet valve actuator and the anti-rumble check valves.

2.1.8 KI 100 HP Inlet Modulation (D10779 – Inlet Valve)

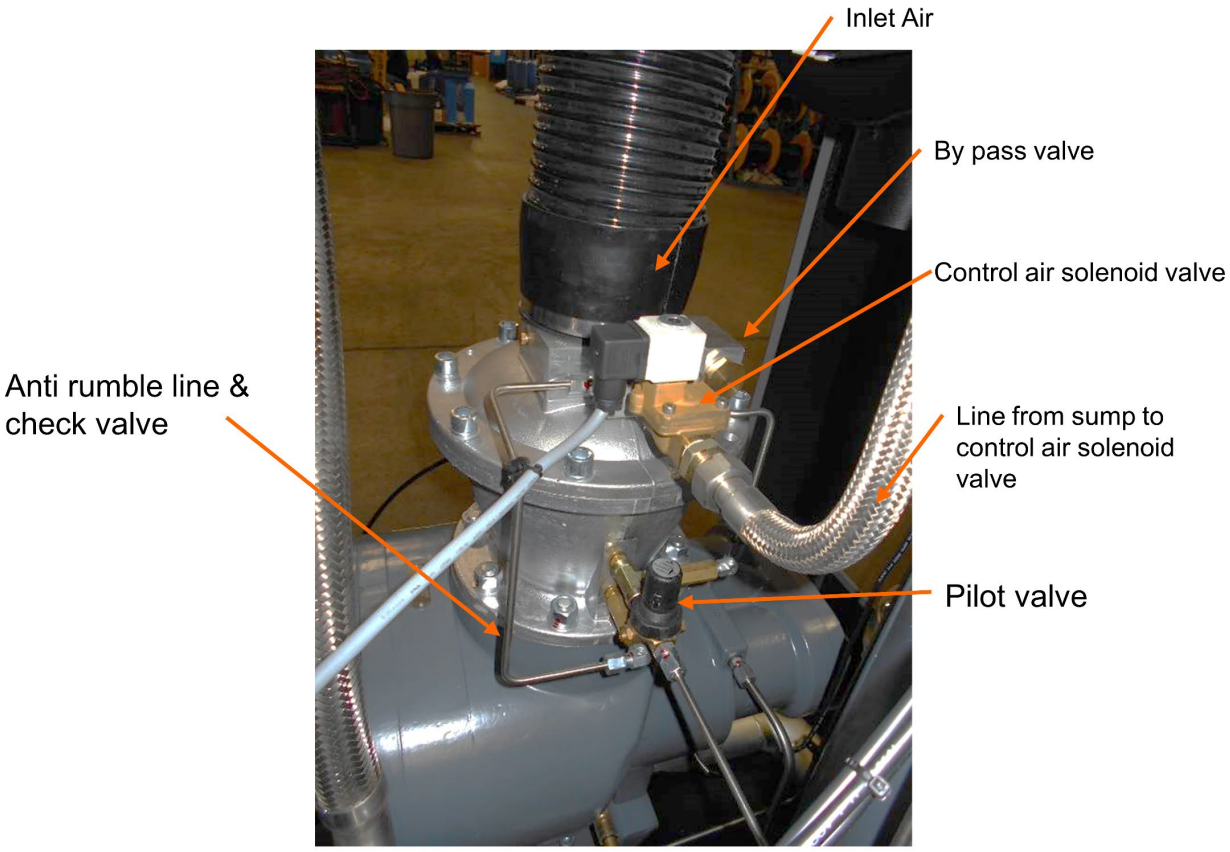
A. The KI-100 is equipped with a pneumatic pilot valve which will progressively modulate (close) the inlet valve based on the pilot valve setting. To use modulation control, open the pilot shut off valve to activate the pilot valve. Closing the pilot shut off valve will deactivate the pilot valve and the compressor will operate load / unload.

B. Load / unload control is detailed in section 2.1.7 above.

C. Typically, the pilot valve is set equal to the LOAD PRESSURE SETPOINT. As pressure rises in the system the pilot valve will send a pneumatic signal to the inlet valve actuator and partially close the inlet valve reducing the compressor output.

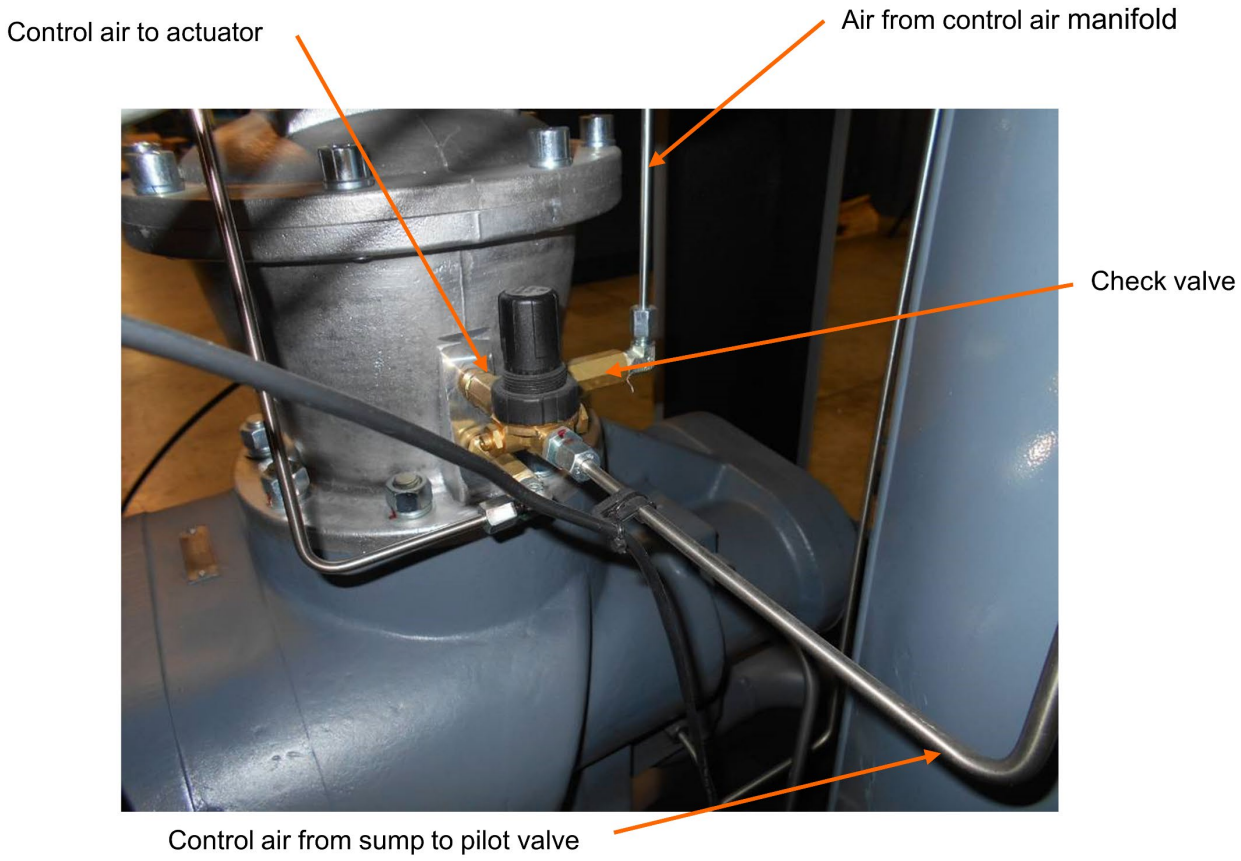
D. See images 6 and 7 for the D10779 Inlet valve, however the pilot shut off valve is not shown.

Image 6
D10779 - Inlet Valve



KI-100 Inlet Valve with Pilot Valve

Image 7
D10779 - Inlet Valve



KI-100 Inlet Valve with Pilot Valve

Note: The pilot valve shut off valve is not shown in images 6 & 7

2.2 Manual Load / Unload

You can manually load or unload the compressor provided the pressure is between the UNLOAD PRESSURE SETPOINT and the LOAD PRESSURE SET POINT.

Press the button  to load if the unit is unloaded. Press the button  to unload if the unit is loaded.

If discharge pressure is outside the UNLOAD and LOAD PRESSURE SET POINTS the compressor will return to its correct state once the button is released.

2.3 Normal Stopping

Press the button "  ", the unloading valve will de-energize back to its "normal" state, allowing control air from the sump to the inlet valve actuator and unload the compressor. The motor will continue to run while the STOP DELAY timer counts down to zero. Typically, the STOP DELAY timer is set for 30 seconds. When the count down timer reaches zero the drive motor and cooling fan will stop.

2.4 Start Delay Timer

To prevent the compressor from starting too often or repeatedly within a short period of time a START DELAY timer will count down to zero before the compressor can restart. The START DELAY timer starts when the compressor finally stops.

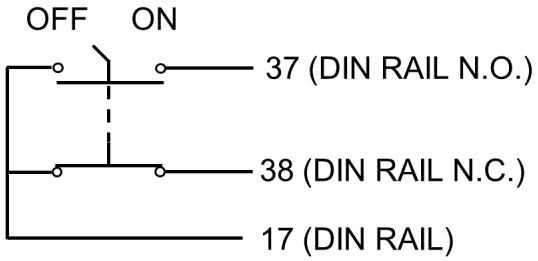
2.5 Remote starting and stopping of the compressor

The KI series of compressors can be started and stopped remotely. The operation is almost the same as the local automatic control; the only difference is that the start and stop of the unit is controlled by remote control. To enable REMOTE start-stop you will need to wire a two-pole, single throw switch with one (1) set of NO and one set of NC contacts.

A. Reset the CDP from the ON-OFF mode to REMOTE using the following commands;
    a. Enter "CUSTOMER PARAMETERS"
    b. Enter "OPERATING"
    c. Enter "ON-OFF MODE"
    d. Enter password (6151 default password)
    e. Set to "REMOTE"
    f. ESC

B. Contact the factory if this feature is desired.

Figure 8
Suggested Wiring Diagram for a KI Remote Run Switch



KI – REMOTE RUN

Warning:

Never perform maintenance work on a compressor without following appropriate lockout/tag out protocols.

Caution:

1. When in 'REMOTE' the local controls can be used to stop the machine. However, as soon as the compressor timed shutdown sequence has completed, the compressor will start automatically again, as long as, the remote control switch is turned to ON.

2. When in 'REMOTE' the E-Stop will stop the compressor. However, upon resetting (pulling out) the E-Stop the compressor will automatically start again if the remote control switch is turned to ON.

The remote ON/OFF switch, wired in this fashion, can also be used to satisfy needs for automatic restart after power failure. Pay particular attention the Warning and Cautions above.

2.6 Network Control – See document "Rogers KI and KIV Series Network Control"

2.7 Fan Temperature Control

The CDP controller has the ability to stop and start the cooling fan based on sump temperature. The KI Series of air compressor does not use this

feature to control lubricate injection temperature. Rather the KI series compressors are equipped with a lubricant temperature control valve located in the lubricant filter head. The cooling fan start and stop temperatures are initially set to 60 °F which will cause the fan to run continuously.

2.8 Failure Stop and Emergency Stop

When any alarm occurs the CDP controller will stop the motor immediately. The motor can only be restarted after the alarm(s) are cleared. The compressor is also equipped with an Emergency Stop button which will shut down the compressor immediately. Do not use the Emergency Stop button for normal compressor stopping.

A. Emergency shut down;
   i. Oil Temperature: -4~300 °F
   ii. Air Temperature: -4~300 °F
   iii. Running Time: 0~999,999 Hours
   iv. Amps Display: 0~999.9A
   v. Pressure: 0~230 psig

B. Phase Sequence Protection: When the compressor is stopped, and an open phase or wrong phase sequence is detected the alarm (shutdown) will activate in ≤ 2s. In most cases the compressor will not start.

C. Motor Protection:
   i. Phase Protection: If a loss of phase is detected, the protection activates per the set point time. If the PHASE PROTECTION DELAY is set to 20 seconds this protection is disabled.

   ii. Motor Rotor Lock Protection: The KI CDP controller is used to protect the main motor from overloads. If the motor is in a locked rotor condition the CDP will alarm and shutdown. The response time is within ≤ 2s.

   iii. Short-Circuit Protection: If the detected current reaches eight (8) times or more above the set value, an alarm will occur and shut the compressor off. The alarm activation time is ≤ 2s.

   iv. Overload Protection (time unit s): The KI Series CDP controller has an overload decision matrix. The CDP will trigger an alarm if the amp draw exceeds the following levels at the times shown. The **I** Set Value is an input in the FACTORY PARAMETERS menu. Typically, the **I** Set Value

is between the name plate and 1.2 times the motor nameplate amps. The CDP continuously calculates the following ratio; **I** Actual Value / **I** Set Value. It then compares this ratio to the times listed below. The motor can tolerate small overloads for a long time, but larger overloads must be addressed quicker.

a. **I** Actual Value / **I** Set Value ≥1.2, Response time = 60s.

b. **I** Actual Value / **I** Set Value ≥1.3, Response time = 48s.

c. **I** Actual Value / **I** Set Value ≥1.5, Response time = 24s.

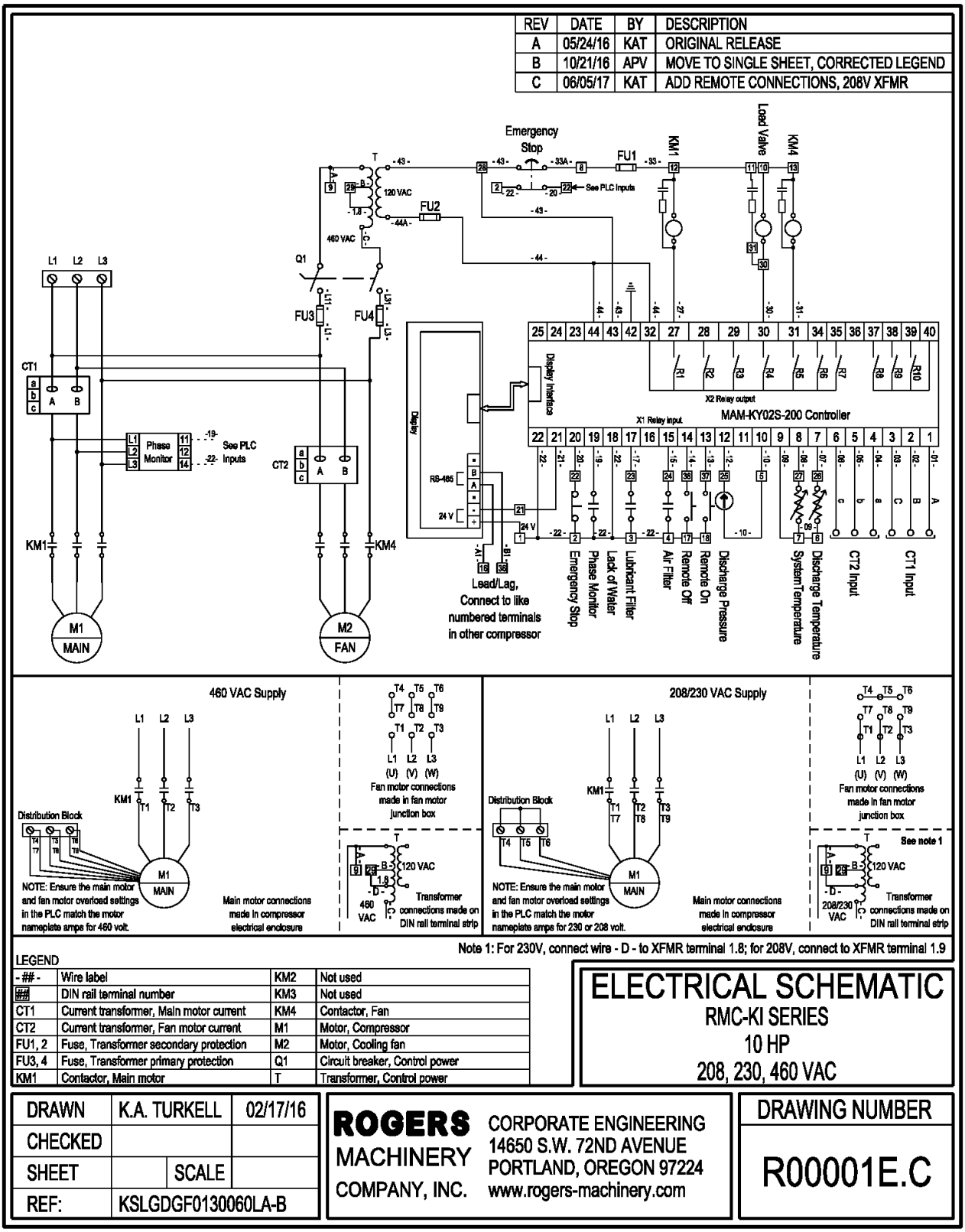
d. **I** Actual Value / **I** Set Value ≥1.6, Response time = 8s.

e. **I** Actual Value / **I** Set Value ≥2.0, Response time = 5s.

f. **I** Actual Value / **I** Set Value ≥3.0, Response time = 1s.

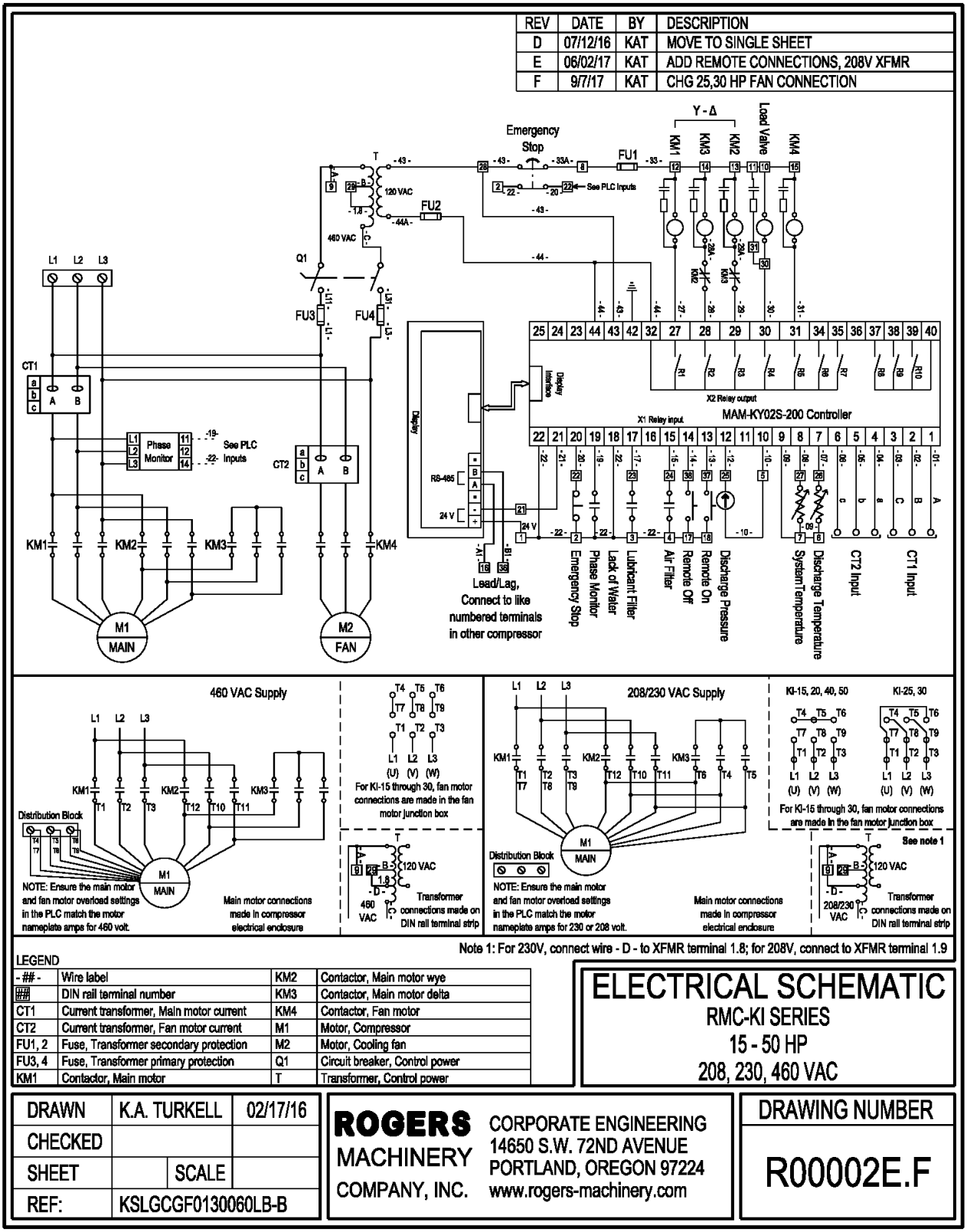
3.0 TYPICAL ELECTRICAL SCHEMATICS

3.1 KI 10 Electrical Schematic R0001E.C



3.2 KI 15-50 HP Electrical Schematic R0002E.F

REV	DATE	BY	DESCRIPTION
D	07/12/16	KAT	MOVE TO SINGLE SHEET
E	06/02/17	KAT	ADD REMOTE CONNECTIONS, 208V XFMR
F	9/7/17	KAT	CHG 25,30 HP FAN CONNECTION



Note 1: For 230V, connect wire - D - to XFMR terminal 1.8; for 208V, connect to XFMR terminal 1.9

LEGEND

- ## -	Wire label	KM2	Contactor, Main motor wye
##	DIN rail terminal number	KM3	Contactor, Main motor delta
CT1	Current transformer, Main motor current	KM4	Contactor, Fan motor
CT2	Current transformer, Fan motor current	M1	Motor, Compressor
FU1, 2	Fuse, Transformer secondary protection	M2	Motor, Cooling fan
FU3, 4	Fuse, Transformer primary protection	Q1	Circuit breaker, Control power
KM1	Contactor, Main motor	T	Transformer, Control power

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RMC-KI SERIES
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208, 230, 460 VAC

DRAWN	K.A. TURKELL	02/17/16
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SHEET	SCALE	
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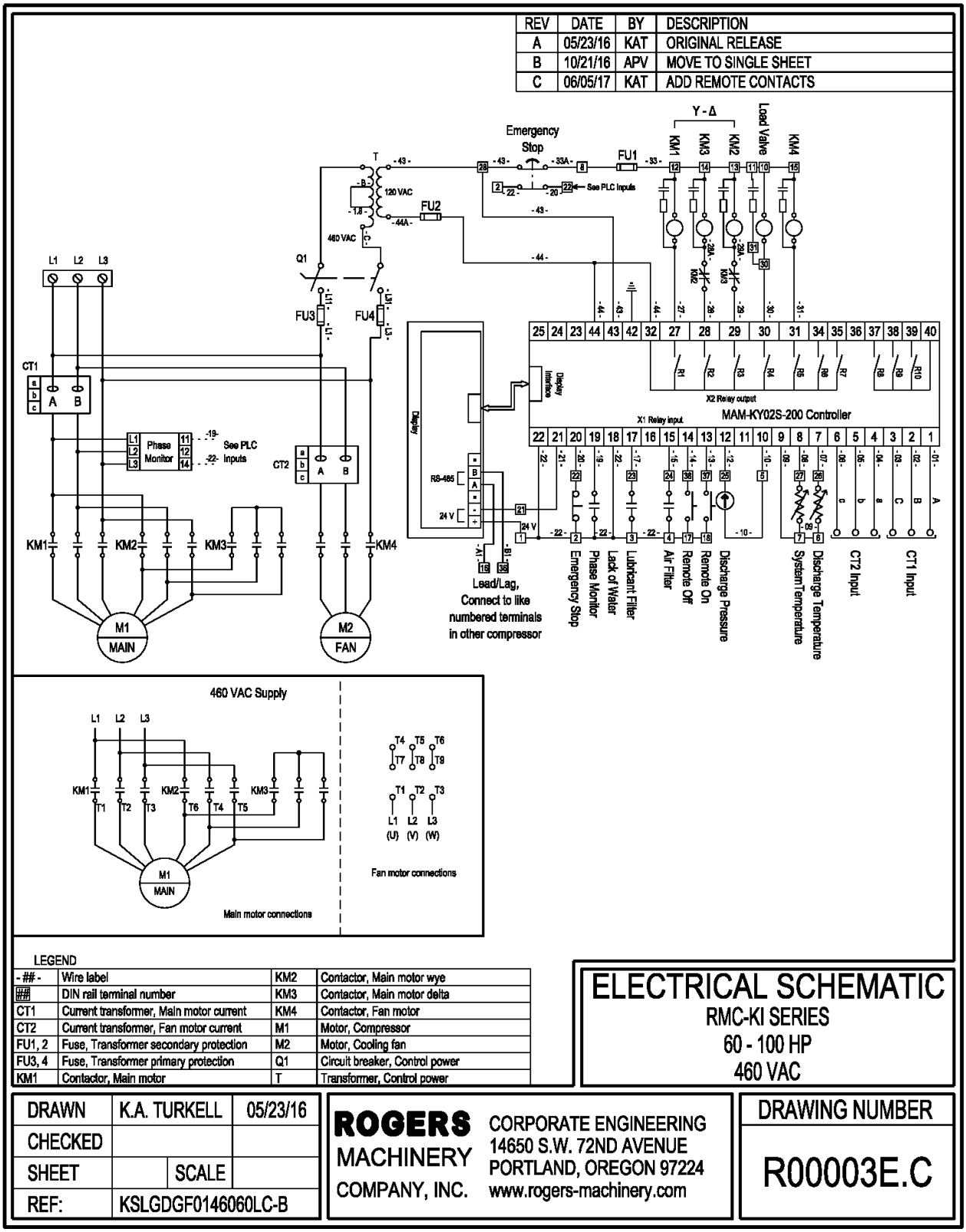
DRAWING NUMBER
R00002E.F

3.3 KI 60-100 HP Electrical Schematic R0003E.C



4.0 ALARMS AND NOTICES

4.1 Text Display Alerts and Trips

4.1.1 Air Filter Alert

a) Check the alarm using the switch signal. The CDP controller can display the message on the text display to remind the operator that “the air filter differential pressure is high” by checking the inlet filter pressure differential switch.

b) Set the time since last service hour meter for air filter service. If you exceed this value an alert will appear.

c) The air filter change reminder can be based on differential pressure or hours since the last change. If the hours method is used change the filter element and reset the hour reminder. Typically, the air filter element is changed every 1,000 hours or earlier if warranted.

4.1.2 Oil Filter Alert

a) Set the time since last service hour meter for oil filter service. If you exceed this value an alert will appear.

b) The oil filter change reminder is based on hours since the last change. Typically, the oil filter is changed every 2,000 hours or earlier if warranted.

4.1.3 Air / Oil Separator Alert

a) Set the time since last service hour meter for oil filter service. If you exceed this value an alert will appear.

b) The air / oil separator change reminder is based on hours since the last change. Typically, the air / oil separator is changed every 3,000 hours or earlier if warranted.

4.1.4 Lubricant Oil Alert

a) The lubricant (oil) change reminder is based on operating hours since the last oil change. Change the oil and reset the hour reminder. Typically, the air / oil separator is changed every 3,000 hours or earlier if warranted.

4.1.5 Main Motor Bearing Grease Alert

a) The “Grease Motor Bearings” reminder is based on operating hours since the last motor bearing maintenance. Grease the motor bearings per the manufacture’s instructions and reset the hour reminder. Typically, main motor bearings are greased every 2,000 hours.

4.1.6 Fan Motor Bearing Grease Alert (40-100 hp units only)

a) The “Grease Fan Motor Bearings” reminder is based on operating hours since the last motor bearing maintenance. Grease the fan motor bearings per the manufacture’s instructions and reset the hour reminder. Typically fan motor bearings are greased every 2,000 hours.

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