



an EnPro Industries company

QSB Series

Rotary Screw Belt Drive Air Compressor

Instruction Manual

This manual contains important safety information and should be made available to all personnel who operate and/or maintain this product. Carefully read this manual before attempting to operate or perform maintenance on this equipment.

Manual No. 65001-RA

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Section II - Description

Capacity Control System

As the motor starts driving the compressor rotors, air is drawn in, compressed and discharged into the air/fluid reservoir. When the air pressure in the air/fluid reservoir exceeds the set point of the pilot valve (normally 100 PSIG), the valve opens and passes a controlled volume of air to the inlet valve air cylinder.

NOTICE!

Other pressures are available optionally.

The air forces a piston to move within the cylinder, closing the inlet valve. The compressor will continue to run, matching air demand with air delivery by constantly adjusting the position of the inlet valve. The inlet valve regulates compressor capacity between 100% and nearly 0% of rated delivery.

When maximum pressure (typically 10 PSIG above normal full load pressure) has been obtained in the air system, complete compressor unloading occurs. The pressure switch located in the control panel sends a signal to the control and the solenoid valve opens, venting the residual pressure from the blowdown valve. At the same time, control air from the reservoir check valve is directed through the solenoid to the inlet valve air cylinder. The inlet valve is held in a closed position preventing the intake of air into the compressor and serving as a check valve preventing reverse air/fluid flow through the inlet valve and air filter.

Auto Dual (Standard)

The Auto Dual system offers two choices of controlling the Quincy QSB/T™ Compressor:

With the selector switch in the Continuous Run position, the compressor operates continuously, matching air demand as the differential pilot valve controls the position of the inlet valve. When maximum system pressure is reached, the pressure switch opens, venting the air/fluid reservoir and, although the compressor continues to run unloaded, no air is compressed.

When Auto Dual is selected, the compressor will perform as above, however, a solid state timer is activated when the pressure switch contacts open. This timer is adjustable within a ten (10) minute range. When the timer reaches the end of its delay period, the compressor will automatically shut down and assume a standby mode. Upon a drop in system air pressure, the pressure switch contacts close, restarting the compressor automatically. The timer should be set, during unit start-up, for a minimum of six (6) minutes.

During the unloaded/timing mode, if plant pressure should drop causing the pressure switch contacts to close, the compressor will continue to operate, resetting the timer and instructing the inlet valve to reopen.

Section IV - Operating Procedures

Stopping the Compressor - Normal Operation

Close the service valve to the plant air distribution system. Allow the pressure to build within the reservoir and the compressor to fully unload. Turn selector switch to the “OFF” position.

NOTICE!

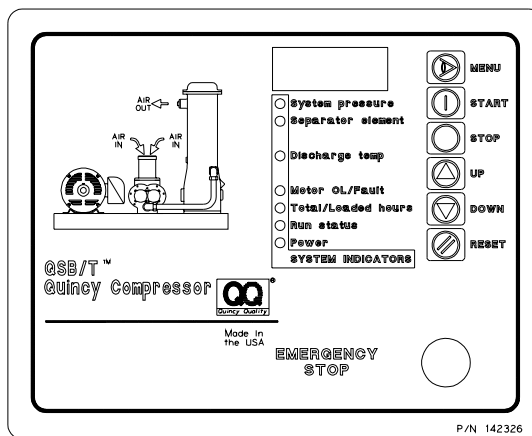
Always close the service valve when the compressor is not being used to prevent the system’s air pressure from leaking back into the compressor if the check valve leaks or fails.

Stopping the Compressor - Emergency

Press the emergency stop button or cut the power at the main disconnect switch or panel.

Electronic Control Operation (optional)

The decal below shows the control layout for the electronic control panel. The primary controls are on the right hand side of the panel, with the selected item being displayed on the LED digits in the top window.



The LED lamps in a vertical column, show the selected display parameter and/or any alarm conditions. On applying system power the LED status lights will blink and the numeric display will show the version number of the software code installed. The system is ready to run when the **Power** and **System pressure** LED lamps are lit and the pressure is displayed in the numeric display.

NOTICE!

A flashing — on the digit display, accompanied by an LED on the left, signifies a faulty sensor (either the pressure transducer or the temperature probe).

A fast blinking LED indicates that the labeled function has been tripped; an overpressure condition or motor overload or high air temperature (HAT) trip.

A slow blinking LED indicates that the separator differential pressure (DP) switch has been tripped.

A steady LED, along with a message blinking on the display, indicates a service time-out. The controller is programmed with recommended service intervals on the fluid filter and the air filter. These filters should be checked and serviced when indicated.

Basic Controls

- 1) **MENU** - scrolls through the set parameters as indicated by the LED lamps to the left, in the following order:
 - a) System pressure (default)
 - b) Discharge temperature
 - c) (Total) Running Hours - shows **run** followed by the hours in alternating form.
 - d) Loaded Hours - shows **load** followed by the hours in alternating form.
 - e) Separator Hours - shows **SEPA** followed by the hours in alternating form.
 - f) *Air Filter Hours - shows **Air.f** followed by the hours in alternating form.
 - g) *Fluid Filter Hours - shows **Flu.f** followed by the hours in alternating form.
 - h) Fluid service/sample hours - shows **FLu** followed by the hours in alternating form. (Total/Loaded LED)

*These have no associated LED indicators.

Section VI - Servicing

Parallel (Shafts are parallel; sheaves not in line)



- 1) To check, use straightedge or string near sheave centers.
- 2) To correct, loosen sheave and relocate on shaft until all four points touch straightedge. Tighten sheave in position.

NOTICE!

Never pry the belts into the sheave grooves. This can damage the belt cords and lead to belt turnover, short life or belt breakage.

Tension Specifications

Use belt tension tester (Quincy part # 142645) when checking and tensioning the belts. See page 31 for instructions on proper use of the belt tension tester.

The spring tensioning system used on 15 through 30 HP units is designed to maintain proper belt tension. However, it is recommended that belt tension be checked monthly and confirmed to be within tension requirements listed in the following table. If not, adjust per instructions on page 32.

QSB/T 10-30 HP TENSIONING DATA

HP	SPRING COLOR	SPRING HEIGHT (IN.) (REFERENCE)		BELT TENSION (LBS.) PRIMARY FOCUS*	
		MIN	MAX	MIN	MAX
15	BLUE	5.9	6.1	6.0	7.0
20	BLUE	5.8	6.0	6.5	7.5
25	YELLOW	5.7	5.9	6.0	7.0
30	GREEN	5.8	6.0	6.0	7.0

* *Must have clearance under pin.*

Belt tension should also be checked monthly on 40 and 50 HP units with the jackbolt tensioning system. Reference the following table for the belt tension specifications on these units. Adjust as necessary, per the instructions on page 33.

QSB/T 40-50 HP BELT TENSION SPECIFICATIONS

*	**	***
NEW BELT TENSION (LBS.)	AFTER RUN-IN TENSION (LBS.)	RETENSION BELT (AT OR BEFORE) (LBS.)
10.5-11.5	10.0	8.5

* *Applies only to new belts at time of installation.*

** *Run-in tension applies to belts after a 2 hour running period.*

*** *Belts must be retensioned at or before reaching this tension.*

Section VII - Compressor Fluids

QuinSyn XP

Effective on orders entered on June 1, 2000 and later, Quincy Compressor® began offering QuinSyn XP, a long life synthetic fluid. QuinSyn XP is the factory fill for high pressure units (defined as units over 125 psig full flow). QuinSyn XP replaces QuinSyn HP 68 as our high pressure fluid and is totally compatible with QuinSyn HP 68 (the fluids can be mixed together with absolutely no problems). Aftermarket pail and drum orders for QuinSyn HP 68 will be filled with QuinSyn XP.

QuinSyn XP is a custom blended polyolester (POE) fluid ideally suited for rotary screw air compressors. QuinSyn XP is an ISO 68 viscosity fluid with a 12,000 hour life at 100 & 125 psig full flow under normal operating conditions and 8,000 hours as a high pressure fluid (exact fluid life is determined by the fluid sampling program). QuinSyn XP is the only fluid available with Quincy's ten-year airend warranty (see Blue Alert #566).

Typical Properties of QuinSyn XP ISO 68

Viscosity @ 100°F ASTM D445	60.0 cSt.
Viscosity @ 210°F ASTM D445	9.8 cSt.
Viscosity Index ASTM D2270	131
Specific Gravity 60/60	0.95
Flash Point ASTM D92	570°F
Fire Point ASTM D92	645°F

Applications

QuinSyn XP is designed for applications where the fluid is exposed to elevated temperatures for extended periods of time. Fluid thermostat temperature settings can be elevated to assist in reducing water content in the fluid in high humidity applications. Consult Quincy's Service Department before making thermostat changes.

Disposal

QuinSyn XP is considered nonhazardous waste. Disposal of this fluid should be done in accordance with Local, State, and Federal regulations. Should condensate need to be treated, Quincy's QIOWA fluid/water separators are required.

Fluid Analysis Program

QuinSyn XP will be analyzed similar to QuinSyn although the primary concern is the total acid number (TAN). Supplemental "on site" TAN kits will be applicable to this fluid as well as QuinSyn PG.

NOTICE!

To maintain extended warranty compliance, fluid samples of QuinSyn XP must be sent to Quincy Compressor® Fluid Analysis a minimum of every 2,000 hours.

Section VII - Compressor Fluids

FLUID PARAMETERS **QuinSyn PG, QuinSyn XP & QuinSyn Plus**

Property	Units	Test Method	Fluid Type	New Fluid	Marginal	Unacceptable
Viscosity 40°C	cSt	ASTM D-445	QuinSyn PG	45-55	41,61	<41, >61 (1)
			QuinSyn XP	58-75	50, 85	<50, >85 (1)
			QuinSyn Plus	42-51	38, 56	<38, >56 (1)
Acid No. TAN	mg KOH/gm	ASTM D-947	QuinSyn PG	<0.2	0.7-0.9	>1 (1)
			QuinSyn XP	<0.2	3-4	>4 (1)
			QuinSyn Plus	<0.2	1.7-1.9	>2.0 (1)
ADDITIVE METALS						
Barium	PPM	Plasma Emission	QuinSyn PG	375-550	150	<10 (1)
			QuinSyn XP	0	5-20	>20
			QuinSyn Plus	0	5-20	>20
Calcium	PPM	Plasma Emission	All	0	5-20	>20
Magnesium	PPM	Plasma Emission	All	0	5-20	>20
Molybdenum	PPM	Plasma Emission	All	0	5-20	>20
Sodium	PPM	Plasma Emission	QuinSyn PG	0	40-50	>100
			QuinSyn XP	0	40-50	>100
			QuinSyn Plus	0	5-20	>20
Phosphorus	PPM	Plasma Emission	QuinSyn PG	0	5-20	>20
			QuinSynXP	<50	5-20	0
			QuinSyn Plus	0	5-20	>20
Zinc	PPM	Plasma Emission	All	0	100-200	>200
WEAR METALS						
Silver	PPM	Plasma Emission	All	0	5-10	>10
Aluminum	PPM	Plasma Emission	All	0	5-10	>10
Chromium	PPM	Plasma Emission	All	0	5-10	>10
Copper	PPM	Plasma Emission	All	0	5-10	>10
Iron	PPM	Plasma Emission	All	0	5-10	>10
Nickel	PPM	Plasma Emission	All	0	5-10	>10
Lead	PPM	Plasma Emission	All	0	5-10	>10
Tin	PPM	Plasma Emission	All	0	5-10	>10
Titanium	PPM	Plasma Emission	All	0	5-10	>10
Vanadium	PPM	Plasma Emission	All	0	5-10	>10
OTHER						
Silicon	PPM	Plasma Emission	All	0	10-15	>15
Water	PPM	Karl Fisher	QuinSyn PG	<2000	NOT REPORTED	
			QuinSynXP	<800	NOT REPORTED	
			QuinSyn Plus	<800	NOT REPORTED	
Antioxidant	%	HPCL	All	95% min.	NOT REPORTED	

(1) The fluid will be condemned based on these parameters.

Section VIII - Troubleshooting

Symptom/Probable Causes:

Corrective Action:

Premature Belt Failure:

BROKEN BELTS:

OBJECT FALLING INTO DRIVE

PROVIDE ADEQUATE GUARDS OR DRIVE PROTECTION.

BELTS FAIL TO CARRY LOAD FOR NO VISIBLE REASON:

DAMAGED TENSILE MEMBER

FOLLOW CORRECT INSTALLATION PROCEDURE.

WORN SHEAVE GROOVES

CHECK GROOVES FOR WEAR. REPLACE SHEAVES AS NECESSARY.

CENTER DISTANCE MOVEMENT

CHECK DRIVE FOR CENTER DISTANCE MOVEMENT DURING OPERATION.

EDGE CORD FAILURE:

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

DAMAGED TENSILE MEMBER

FOLLOW CORRECT INSTALLATION PROCEDURE.

V-Belts Turn over or Come Off Drive:

FOREIGN MATERIAL IN GROOVES

PROVIDE ADEQUATE GUARDS OR DRIVE PROTECTION.

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

WORN SHEAVE GROOVES

REPLACE SHEAVES.

DAMAGED TENSILE MEMBERS (BELTS PRIED ON)

FOLLOW CORRECT INSTALLATION PROCEDURE.

MISMATCHED BELT SET

INSTALL NEW MATCHED BELT SET. (DO NOT MIX OLD AND NEW BELTS.)

Belt Stretches Beyond Available Take-up:

MISALIGNMENT

REALIGN AND RETENSION DRIVE.

DEBRIS IN SHEAVES

CLEAN SHEAVES.

BROKEN TENSILE MEMBER OR CORD DAMAGE

REPLACE ALL BELTS.

MISMATCHED BELTS

INSTALL NEW MATCHED BELT SET. (DO NOT MIX OLD AND NEW BELTS.)

Appendix B - Technical Data

QSB/T 15

Full Load Operating Pressure		psig	100	125
Maximum Operating Pressure		psig	115	140
Minimum Operating Pressure		psig	75	←
Maximum Ambient Operating Temperature		°F	110	←
Minimum Ambient Operating Temperature		°F	35	←
Compressor Drive Motor		HP	15	←
Full Load Drive Motor HP		BHP	16.0	15.6
Unloaded Drive Motor HP		BHP	4.32	3.9
Drive Motor Service Factor			1.15	←
Drive Motor Speed		RPM	1770	←
Rotor Diameter		mm	127.5	←
Male Rotor Speed		rpm	1279	1036
Female Rotor Speed		rpm	853	691
Rotor Tip Speed		m/sec.	8.54	6.92
Inlet Capacity		acfm	62	48
<u>Aftercooling</u>				
Heat Rejection:	Fluid Cooler	BTU/min.	577	563
	Aftercooler	BTU/min.	109	91
Aftercooler Approach (standard conditions)		°F	8	←
Maximum Allowable Static Backpressure		in./H ₂ O	0.125	←
Fan Flow		cfm	2126	←
<u>Water-cooled Cooling</u>				
<i>(Consult factory for water temperatures under 50°F or over 90°F and for water/glycol cooling systems.)</i>				
Recommended Inlet Water Pressure		psig	40-100	←
Aftercooler Approach to Cooling (water temperature)		°F	15	←
Water Flow with Aftercooler at:	50°F	gpm	1.1	←
	70°F	gpm	1.5	←
	90°F	gpm	2.6	←
<u>Compressor Fluid</u>				
Total Fluid Capacity		gallons	3.8	←
Reservoir Fluid Capacity		gallons	2.5	←
Fluid Flow		gpm	8.4	9.3
Typical Fluid Carryover		ppm	3-5	←
Normal Airend Discharge Temperature		°F	175-195	←
<u>Sound (at 1 meter) (Base/Tank)</u>				
Unenclosed (AC/WC)		dB(A)	76/76	←
Standard Cabinet (AC/WC)		dB(A)	73/76	←
Low Sound Cabinet (AC)		dB(A)	67/69	←

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