metso automation

IMO - 550EN

Issue Date: 9/07

INSTALLATION, MAINTENANCE, AND OPERATING INSTRUCTIONS

CINTAC
ADVANCED AUTOMATION SYSTEM

Read entire instructions carefully before installation or servicing

TABLE OF CONTENTS

1 GENERAL

This instruction manual contains important information regarding the installation, operation and troubleshooting of Jamesbury® CINTAC Advanced Automation System. Please read these instructions carefully and save them for further reference.

1.1 WARNING

1. FOR YOUR SAFETY, IT IS IMPORTANT THAT THE FOLLOWING PRECAUTIONS BE TAKEN PRIOR TO SERVICING.
2. KEEP HANDS AND CLOTHING AWAY FROM THE VALVE PORTS AND MOVING PARTS AT ALL TIMES.
3. DO NOT ATTEMPT TO DISASSEMBLE INDIVIDUAL SPRING CARTRIDGES. DISASSEMBLY OF THE CARTRIDGE MAY RESULT IN SERIOUS PERSONAL INJURY. IF MAINTENANCE OF THE CARTRIDGE IS NECESSARY, IT MUST BE RETURNED TO METSO AUTOMATION.
4. SHUT OFF AND BLEED ALL SUPPLY LINES BEFORE INSTALLATION OR SERVICING. DO NOT REMOVE END CAP WHILE THE ACTUATOR IS PRESSURIZED.
5. BEFORE INSTALLING THE VALVE AND ACTUATOR, BE SURE THAT THE VISUAL INDICATOR ON TOP OF THE COMMUNICATIONS AND CONTROLS MODULE CORRECTLY SHOWS THE VALVE POSITION. FAILURE TO ASSEMBLE THESE PRODUCTS TO INDICATE THE CORRECT VALVE POSITION COULD RESULT IN PERSONAL INJURY.
6. OPERATING THE ACTUATOR OVER THE TEMPERATURE LIMITS MAY DAMAGE INTERNAL AND EXTERNAL COMPONENTS.
7. OPERATING OVER PRESSURE LIMITS MAY RESULT IN PREMATURE FAILURE AS WELL AS DAMAGE TO THE HOUSING.

2 TECHNICAL DATA

2.1 Pneumatic Module

Operating Media:	Dry or lubricated air or inert gas.
Air Supply:	120 psi (8.3 bar) Maximum.
Temperature:	
Standard:	-4° to 175°F (-20° to 80°C)
Low Temp. Option:	-40° to 120°F (-40° to 49°C)
Lubrication:	Factory lubricated for the life of the actuator under normal operating conditions.
External Travel Stops:	±4 degree adjustment on 90 degree stroke.

2.2 Communications and Control Module (See specific sensor model data sheet)

2.2.1 SST Switching Sensors Module 33

Sensors:	(2) NO 2-wire Solid State
Sensors Voltage Range:	20 to 125 VDC 110 to 125 VAC
Max Current Continuous:	0.25 Amps
Minimum On Current:	2.0 mA
Max Leakage Current:	0.5 mA
Max Voltage Drop:	7.0 Volts @ 100mA
Circuit Protection:	Protected against short circuits and direct application of voltage with no load.

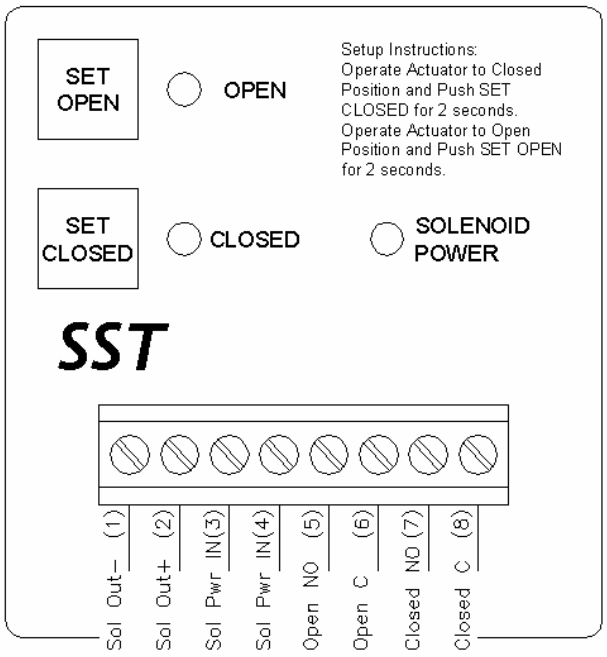


Figure 1A

To Bench Test a SST Sensing & Communications Module:

Power must be applied to both sensors to ensure proper circuit operation. Use a 24 VDC power supply with series load resistor, (2K - 6K), connected to the 24 VDC+. Operate actuator to the closed position. Connect 24 VDC+ to the "Closed C" (common) and "Open C" (common) terminals. Connect 24 VDC- to the "Closed NO" and "Open NO" terminals. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. To test solenoid, apply power to the "Sol Pwr IN" terminals only. See warning below.

<u>WARNING:</u> DO NOT APPLY EXTERNAL POWER TO THE "Sol Out" TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

<u>CAUTION:</u> A SERIES LOAD RESISTOR MUST BE USED WHEN BENCH TESTING IN ORDER TO ENSURE PROPER MODULE OPERATION.

2.2.2 Namur Switching Sensors Module 44

Outputs: (2) NAMUR Sensors (DIN 19234)
Voltage Range: 7 to 24 VDC
Current Ratings:
Target Present Current<1.0 mA (LED = OFF)
Target Absent Current>2.1 mA (LED = ON)
Use with intrinsically safe repeater barrier.
NAMUR sensors fully conform to DIN 19234 Standard.

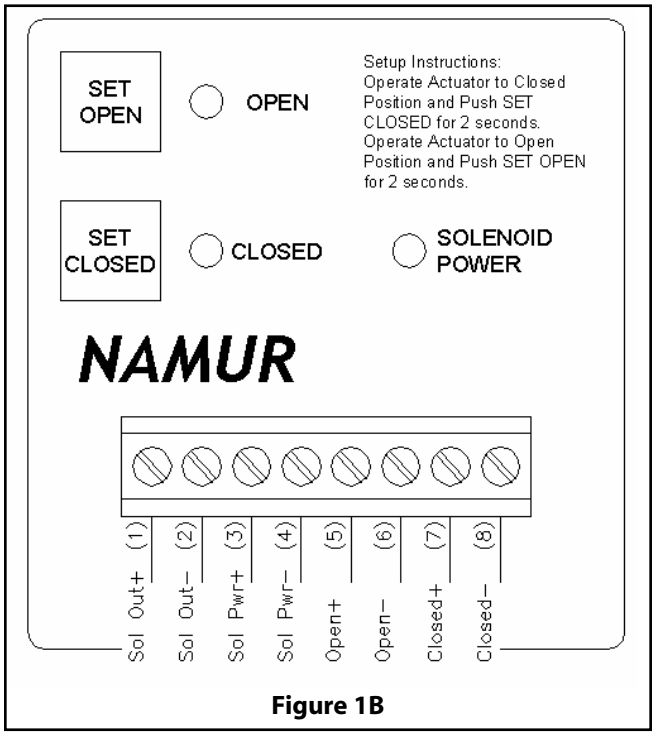


Figure 1B

To Bench Test a Namur Sensing & Communications Module:

Power must be applied to both sensors to ensure proper circuit operation. Use a 24 VDC power supply. A series load resistor is not required when bench testing. Operate actuator to the closed position. Connect 24 Vdc+ to the "Closed +" and "Open +" terminals. Connect 24 Vdc- to the "Closed -" and "Open -" terminals. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed.

2.2.3 DeviceNet Module 92

Communication Protocol: DeviceNet
Configuration: (2) Discrete Inputs (Sensors)
(1) Aux. Analog Input (4-20mA)
(2) Discrete Outputs (Solenoids)
Voltage: 24 VDC via DeviceNet network
Output Voltage: 24 VDC
Max. Output Current: 160mA, Both Outputs Combined
Max. Output Power: 4 Watts, Both Outputs Combined
Default Address: 63
Default Baud Rate: 125K
Bit Assignment:

Inputs (3 Bytes)	Outputs (1 Byte)
Bit 0 = Red LED	Bit 0 = OUT 1
Bit 1 = Green LED	Bit 1 = OUT 2
Bit 4 = Fault Bit	
Bits 8-15 = Analog Input (Low Byte)	
Bits 16-23 = Analog Input (High Byte)	

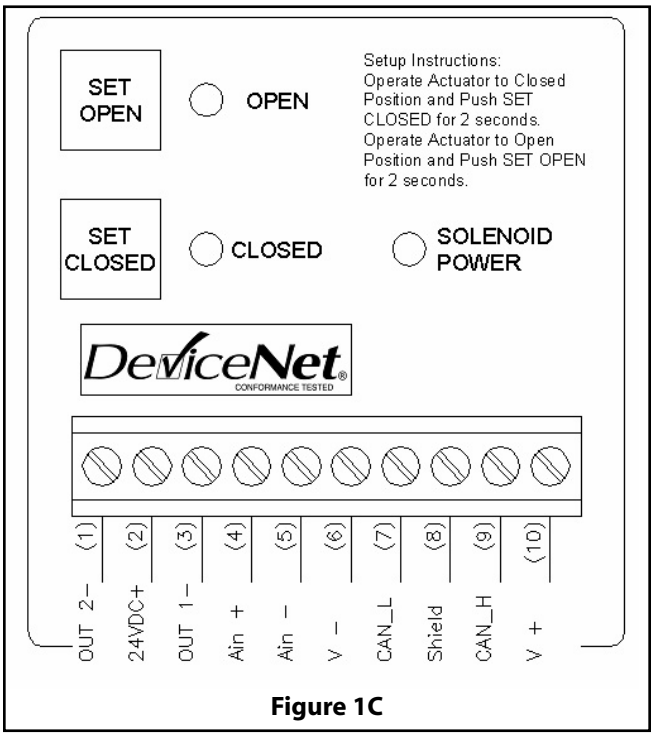


Figure 1C

To Bench Test a DeviceNet Sensing & Communications Module:

To test sensors, use a 24 VDC power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "V+" and "V-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning DeviceNet network is required to test communications.

<u>WARNING:</u> DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.4 Foundation Fieldbus Module 93

Communication Protocol: Foundation Fieldbus (H1)
Configuration: (2) Discrete Inputs (Sensors)
(2) Discrete Outputs (Piezo Valves)
Voltage: 9-32 VDC (Bus Voltage)
Output Voltage: 6.5 VDC
Max. Output Current: 2.0mA @ 6.5 VDC
Current Draw: 16mA
Function Blocks: Channel 1 = DI1 (Green LED)
Channel 2 = DI2 (Red LED)
Channel 3 = DO1 (OUT 1)
Channel 4 = DO2 (OUT 2)

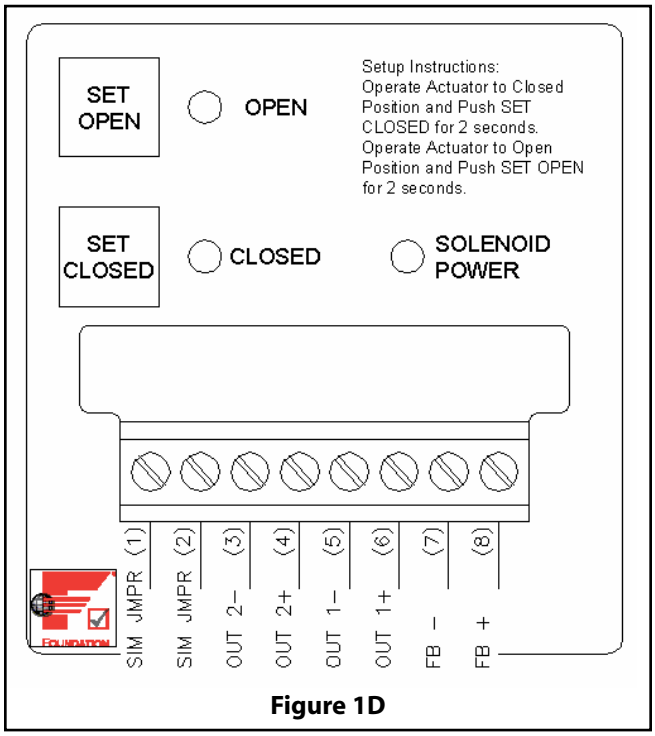


Figure 1D

To Bench Test a Foundation Fieldbus Sensing & Communications Module:

To test sensors, use a 9-32 VDC power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "FB+" and "FB-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning Foundation Fieldbus network is required to test communications.

WARNING: DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.5 Foundation Fieldbus Module 94

Communication Protocol: Foundation Fieldbus (H1)
Configuration: (2) Discrete Inputs (Sensors)
(2) Discrete Outputs (Ext Powered)
Voltage: 9-32 VDC (Bus Voltage)
Max. Bus Current Draw: 16mA
External Voltage: 24 VDC
Output Current Consumption: 22mA (1 solenoid)
Max. Output Current: 200mA
Function Blocks: Channel 1 = DI1 (Green LED)
Channel 2 = DI2 (Red LED)
Channel 3 = DO1 (OUT 1)
Channel 4 = DO2 (OUT 2)

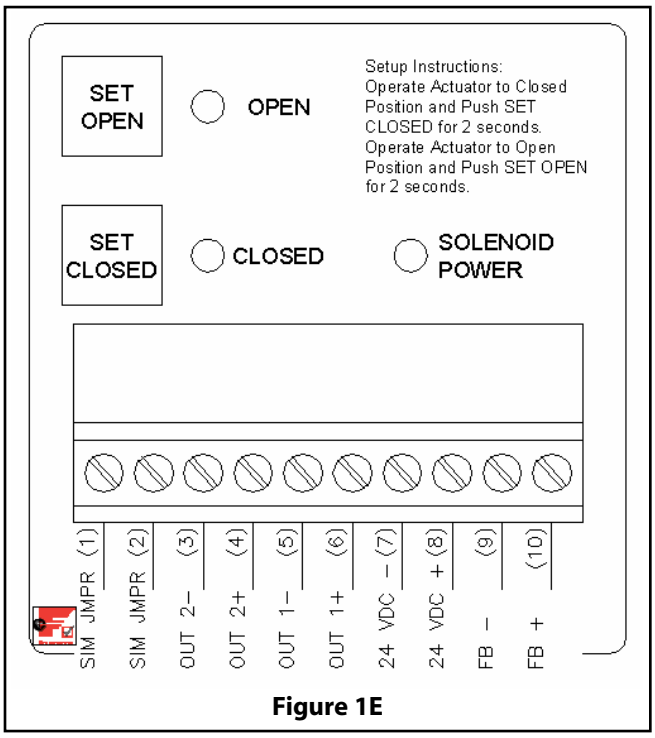


Figure 1E

To Bench Test a Foundation Fieldbus Sensing & Communications Module:

To test sensors, use a 9-32 Vdc power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "FB+" and "FB-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. Apply external 24 VDC to 24VDC IN + and 24VDC IN - to test devices connected to the discrete outputs. A functioning Foundation Fieldbus network is required to test communications.

WARNING: DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.6 ModBus Module 95

Communication Protocol: ModBus
Configuration: (2) Discrete Inputs (Sensors)
(1) Aux. Analog Input (4-20mA)
(2) Discrete Outputs (Solenoids)
Voltage: 24 VDC via ModBus network
Output Voltage: 24 VDC
Max. Output Current: 160mA, Both Outputs Combined
Max. Output Power: 4 Watts, Both Outputs Combined
Default Address: 03
Bit Assignment: Inputs
10001 = Red LED (Bottom Sensor)
10002 = Green LED (Top Sensor)
30001 = Analog Input
Outputs
00001 = OUT 1
00002 = OUT 2

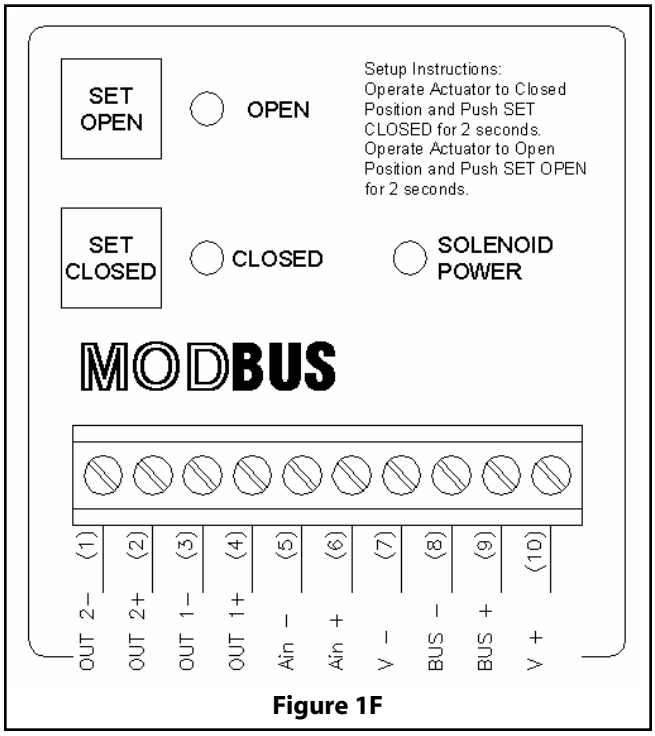


Figure 1F

To Bench Test a ModBus Sensing & Communications Module:

To test sensors, use a 24 VDC power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "V+" and "V-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning ModBus network is required to test communications.

WARNING: DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.7 AS-Interface Module 96

Communication Protocol: AS-Interface
Configuration: (2) Discrete Inputs (Sensors)
(2) Auxiliary Discrete Inputs
(2) Discrete Outputs (Solenoids)
Voltage: 26.5 – 30.6 VDC (AS-I Voltage)
Output Voltage: 24 VDC
Current Consumption: 42mA (1 solenoid)
Max. Output Current: 200mA
ID/IO Codes: ID = F; IO = 4; ID1 = F; ID2 = E
Default Address: 00
Bit Assignment:

Inputs	Outputs
Bit 1 = Aux Input 1	Bit 1 = Not Used
Bit 2 = Aux input 2	Bit 2 = Not Used
Bit 3 = Green LED	Bit 3 = OUT 1
Bit 4 = Red LED	Bit 4 = OUT 2

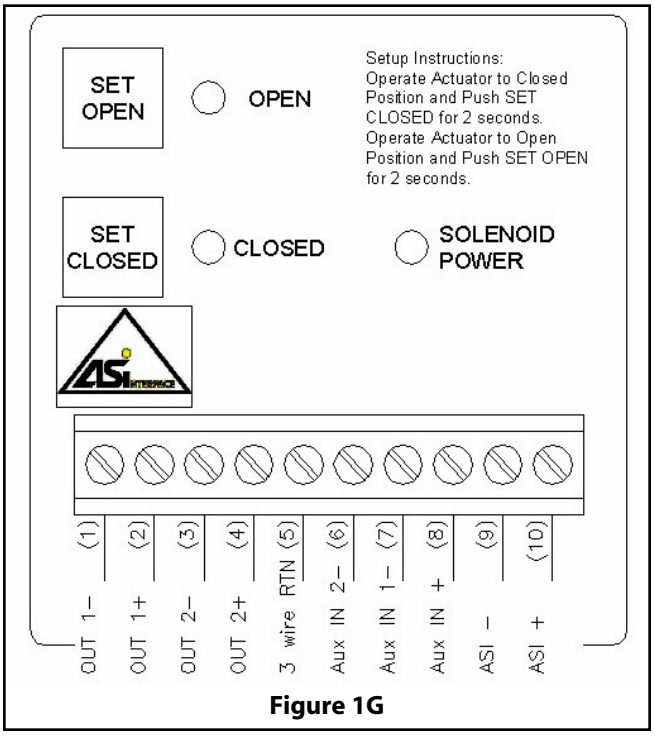


Figure 1G

To Bench Test an AS-Interface Sensing & Communications Module:

To test sensors, use a 24 VDC power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "ASI+" and "ASI-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning AS-Interface network is required to test communications.

WARNING: DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.8 AS-Interface Module 97

Communication Protocol: AS-Interface
Configuration: (2) Discrete Inputs (Sensors)
(2) Auxiliary Discrete Inputs
(1) Discrete Output (Solenoid)
Voltage: 26.5 – 30.6 VDC (AS-I Voltage)
Output Voltage: 24 VDC
Current Consumption: 42mA (1 solenoid)
Max. Output Current: 100mA
ID/IO Codes: ID = A; IO = 4; ID1 = F; ID2 = E
Default Address: 0A
Bit Assignment:

Inputs	Outputs
Bit 1 = Aux Input 1	Bit 1 = Not Used
Bit 2 = Aux input 2	Bit 2 = Not Used
Bit 3 = Green LED	Bit 3 = OUT 1
Bit 4 = Red LED	Bit 4 = Not Used

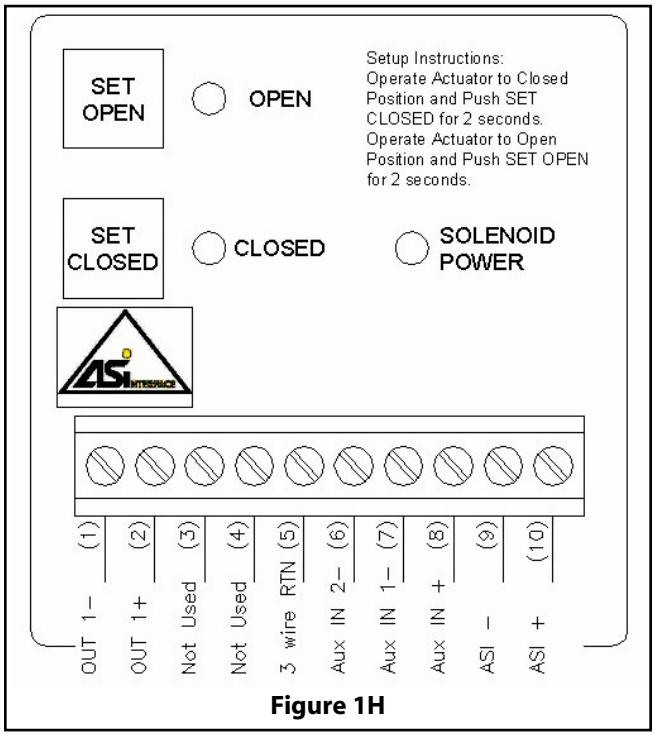


Figure 1H

To Bench Test an AS-Interface Sensing & Communications Module:

To test sensors, use a 24 VDC power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "ASI+" and "ASI-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning AS-Interface network is required to test communications.

<u>WARNING:</u> DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.9 AS-Interface Module 96 with Diagnostics

Communication Protocol: AS-Interface
Configuration: (2) Discrete Inputs (Sensors)
(1) Discrete Output (Solenoids)
Onboard Diagnostics with LED's
Voltage: 26.5-30.6 VDC (AS-I Voltage)
Output Voltage: 24 VDC
Current Consumption: 43mA (solenoid + one LED lit)
Max. Current Consumption: Less than 50mA
ID/IO Codes: ID = F; IO = 7 (4DI/4DO)
Default Address: 00
Bit Assignment:

Inputs	Outputs
Bit 1 = Low Power Supply	Bit 1 = Remote set Close Sensor
Bit 2 = Stuck Valve/Actuator	Bit 2 = Remote set Close Sensor
Bit 3 = Open Sensor (Green LED)	Bit 3 = Solenoid
Bit 4 = Closed Sensor (Red LED)	Bit 4 = Wink Feature

Parameters
Bit 1 0 = Spring–to-open actuator 1 = Spring–to-close actuator;
Bit 2 Not Used
Bit 3 Not Used
Bit 4 Not Used
Peripheral Fault Bit (pertains v2.1 or higher ASi Masters only)
0=Normal Status;
1=Bad Solenoid Coil or Stuck Spool/Pilot Valve

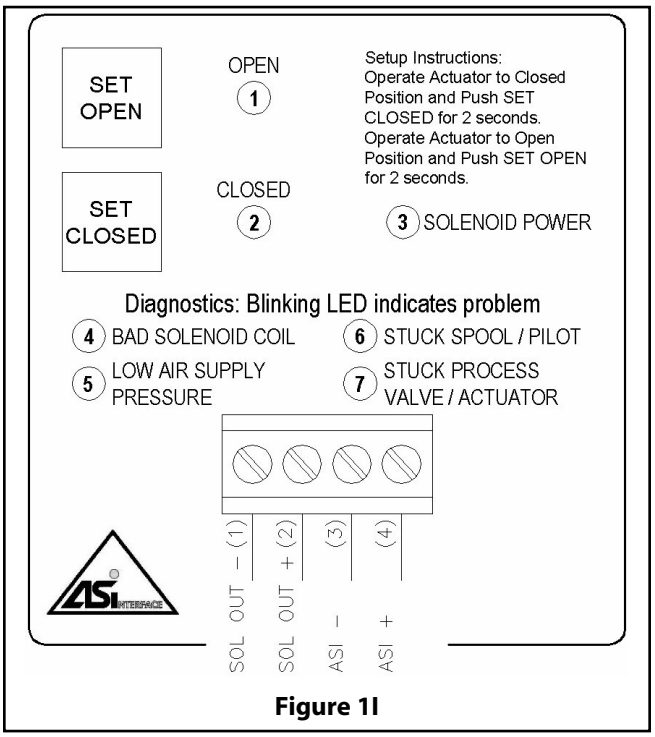


Figure 1I

To Bench Test an AS-Interface Sensing & Communications Module:

To test sensors, use a 24 Vdc power supply. No series load resistor is required. Operate actuator to the closed position. Apply power across the "ASI+" and "ASI-" terminal points. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Release button.

Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button. Set points are retained even after power is removed. A functioning AS-Interface network is required to test communications.

WARNING: DO NOT APPLY EXTERNAL POWER TO THE OUTPUT TERMINALS. THIS WILL CAUSE PERMANENT DAMAGE TO THE UNIT.

2.2.9.1 LED Indications

① The OPEN green LED is lit continuously when the valve is in the open position and the open position sensor is ON. Input Bit 3 (DI2) will be set to "1". If the valve is open and the LED is not lit, perform the "Setting the Sensor Settings of the Communication and Control Module" Section 4.3 located on the bottom of Page 10.

② The CLOSED red LED is lit continuously when the valve is in the closed position and the closed position sensor is ON. Input Bit 4 (DI3) will be set to "1". If the valve is closed and the LED is not lit, perform the "Setting the Sensor Settings of the Communication and Control Module" Section 4.3 located on the bottom of Page 10.

③ The SOLENOID POWER yellow LED is lit continuously when Output Bit 3 (DO2) is set to "1" to energize the solenoid.

④ The BAD SOLENOID COIL red LED will flash at a 2Hz rate if the solenoid pilot valve coil windings are either open or shorted. The Peripheral Fault Bit will be set to "1". Fault indication will clear when solenoid pilot valve is replaced.

⑤ The LOW AIR SUPPLY PRESSURE red LED will flash at a 2Hz rate if the supply pressure drops below 40 psi (2.8 bar). Input Bit 1 (DI 0) will be set to "1". Fault indication will clear when supply pressure goes back above 40 psi (2.8 bar).

⑥ The STUCK SPOOL/PILOT red LED will flash at a 2Hz rate if after 5 seconds** of power being applied to the coil, the internal porting pressure does not rise above 10 psi (0.7 bar). Conversely, if after 5 seconds** of power being removed from the coil and the internal porting pressure does not drop below 30 psi (2.1 bar), a STUCK SPOOL/PILOT fault will be indicated. For either condition, the Peripheral Fault Bit will be set to "1". Fault indication will remain active until internal porting pressure requirements are met.

⑦ The STUCK PROCESS VALVE/ACTUATOR red LED will flash at a 2Hz rate if after 5 seconds** of power being applied to or removed from the coil, the valve/actuator does not move by a minimum of 10% of stroke, provided there is not a STUCK SPOOL/PILOT or LOW AIR SUPPLY PRESSURE fault already indicated. Input Bit 2 (DI 1) will be set to "1". A STUCK PROCESS VALVE/ACTUATOR fault will also be indicated if the valve/actuator doe not reach the commanded position within 20 seconds** (Valve open position when solenoid coil is energized or valve closed position when solenoid coil is de-energized). This is also referred to as a "Stroke Time Alarm". Input Bit 2 (DI 1) will be set to "1".

****NOTE:** The Factory default time settings of the Stroke Time Alarm circuit is 20 seconds for valve Full Stroke Time and 5 seconds for the STUCK SPOOL/PILOT and the STUCK PROCESS VALVE/ACTUATOR diagnostic functions. The Stroke Time Alarm circuit timing is manually adjustable from 1 to 60 seconds. When manually setting the Full Stroke Time, the secondary timing used in the STUCK SPOOL/PILOT and the STUCK PROCESS VALVE/ACTUATOR diagnostic functions is fixed to one half the time period of the Full Stroke Time.
(For example: if Full Stroke Time is set to 30 seconds, the time out for the STUCK SPOOL/PILOT and the STUCK PROCESS VALVE/ACTUATOR diagnostic functions will be 15 seconds).

2.2.9.2 Stroke Time Alarm Adjustment Procedure

WARNING: VALVE/ACTUATOR WILL AUTOMATICALLY STROKE WHILE PERFORMING THIS PROCEDURE.

1. Read all instructions prior to performing this procedure. The Stroke Time Alarm is adjustable from 1 to 60 seconds. AS-Interface communications is not needed to perform this procedure, however, a 24 vdc power source connected to the ASI+ and ASI- and an air source of a minimum of 40 psi (2.8 bar) connected to the Cintac supply pressure port (Port 1) will be required.

2. Ensure the CLOSED and OPEN sensors have been set. If not, perform the "Setting the Sensor Settings of the Communication and Control Module" Section 4.3 located on the bottom of Page 10.

3. With the valve/actuator in the closed position, verify there are no fault indications, then press and hold both the SET CLOSED and SET OPEN buttons until both the CLOSED and OPEN LED's are lit (2 seconds). Release both buttons, the red CLOSED LED should be flashing.

4. Push the SET CLOSED button to start the Timer function. The valve/actuator will automatically open and the OPEN LED will start to flash.

5. After the valve/actuator has fully opened, wait the desired time the Stroke Time Alarm is to be set to (1 to 60 seconds), then push the SET OPEN button. This will stop the Timer function and the valve/actuator will automatically go back to the closed position.

6. The unit is ready to resume normal operation.

2.2.9.3 Remote Sensor Setting Feature

1. The Cintac with Diagnostics provides the capability of setting the Closed and Open sensors remotely from the Control System or from the AS-Interface Gateway/ Master.

2. AS-Interface communications are required in order to remotely set the sensors. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.

3. With the valve/actuator in the closed position, set Output Bit 1 (DO 0) to "1" for at least two seconds. This will set the Closed sensor to that valve/actuator position. Set Output Bit 1 (DO 0) back to "0"

4. With the valve/actuator in the open position, set Output Bit 2 (DO 1) to "1" for at least two seconds. This will set the Open sensor to that valve/actuator position. Set Output Bit 2 (DO 1) back to "0"

2.2.9.4 The "Wink" Feature

The Cintac with Diagnostics provides the capability of setting the CLOSED and OPEN LED's to simultaneously flash or "wink". This feature aids in physically locating the unit on the network.

1. AS-Interface communications are required in order to set the "Wink" feature. The unit must be addressed and correctly configured to be recognized by the Control System or the AS-Interface Gateway/Master.

2. Set Output Bit 4 (DO 3) to "1" in the desired unit. Once the correct unit has been physically located on the network, indicated by the "winking" of the CLOSED and OPEN LED's, set Output Bit 4 (DO 3) back to "0". Performing this function will not change the Closed and Open sensor set points.

2.3 Pneumatic Solenoid Valve General Penumatic Specifications

Valve Design:	Pilot operated spool valve
Pilot Operator Options:	Solenoid Coil or Piezo
Configuration: Single Pilot:	5-Way, 2-Position, Spring Return
Flow Rating:	0.75 Cv (0.64 Kv)
Operating Pressure:	40 psi to 120 psi (2.8 to 8.3 bar)
Filtration:	40 Microns for (1H), 1D), and (1E), 30 Microns for Piezo (1A)
Manual Override:	Internal momentary

Material of Construction:

Spool:	Anodized aluminum
Body:	Epoxy coated anodized aluminum
O-ring Spacers:	Polysulphone
End Caps & Fasteners:	Stainless Steel
O-rings:	Nitrile Compound

Solenoid Coil Specifications General Penumatic Specifications

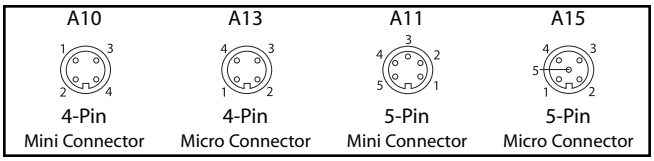
24 VDC/120 VAC Universal (1H)
Operating Voltage: 22 VDC min/130 VAC max
Power Consumption: 0.6 Watts
AC Current Consumption: 18mA
Operating Temperature: -18° C to 60° C (0° F to 140° F)

24 VDC (1D)
Operating Voltage: 24 VDC
Power Consumption: 0.5 Watts
Operating Temperature: -18° C to 60° C (0° F to 140° F)

12 VDC (1E) (Intrinsically Safe)
Operating Voltage: 12 VDC (output of barrier)
Power Consumption: 0.5 Watts
Operating Temperature: -18° C to 60° C (0° F to 140° F)
Entity Parameters: Ui=28VDC; Ii=120mA; Ci=0; Li=0; Pi=1.0W

Piezo (1A)
Operating Voltage: 5.5 VDC to 9.0 VDC
Current Consumption: 2.0 mA @ 6.5 VDC
Temperature Range: -10° C to 60° C (14° F to 140° F)

2.4 Optional 4-Pin and 5-Pin Mini and Micro Connectors



PIN	AMI 93_A10 or A13	AMI 94_A10 or A13	AMI 96_A10 or A13	AMI 97_A10 or A13
1	FB-	FB-	ASI +	ASI +
2	FB+	FB+	Not Used	Not Used
3	Not Used	24 VDC +	ASI -	ASI-
4	Not Used	24 VDC -	Not Used	Not Used

PIN	AMI 33_A11 or A15	AMI 92_A11 or A15	AMI 95_A11 or A15
1	OPEN / CLOSED C	Shield	Not Used
2	CLOSED NO	V +	V+
3	OPEN NO	V -	V-
4	SOL PWR +	CAN_H	BUS +
5	SOL PWR -	CAN_L	BUS -

3 INSTALLATION

Mount the actuator to the valve, following the direction in the linkage AMI or valve IMO.

4 SETTING THE EXTERNAL STOPS, VISUAL INDICATOR AND SENSORS.

Connect a regulated air supply to port #1 (1/4" NPT) on the CCM body. **CAUTION:** The maximum operating pressure is 120 psi (8.3 bar).

Follow the wiring schematic for the specific Communications and Control Module (CCM) ordered along with the correct operating voltage for the specific solenoid ordered. With the Sensor & Communication and Control Module (CCM) wired to the control system and power applied, operate actuator to the closed position.

4.1 Setting the External Stops of the Pneumatic Module

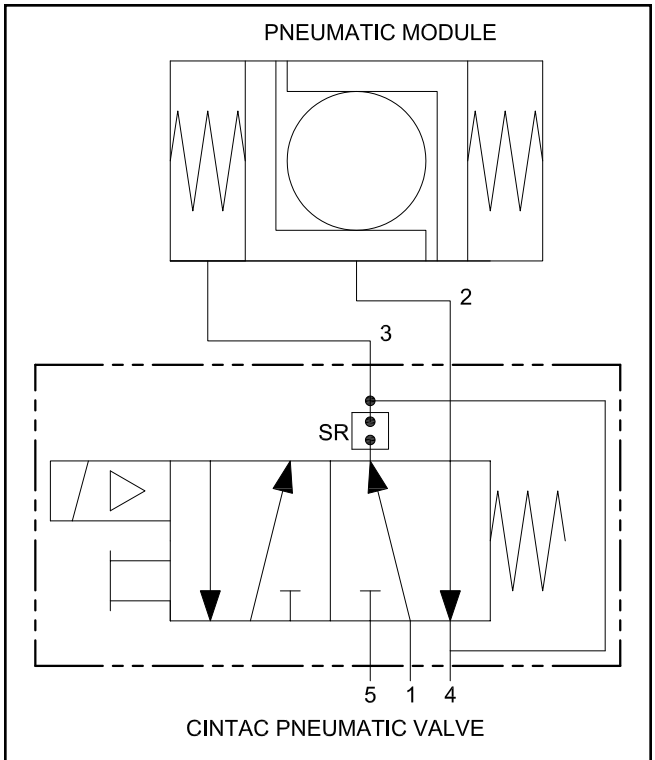
1. Adjust the stop screws as follows (Note: the stops screws can be adjusted by up to ± 4 degrees)
2. When looking at the external travel stops, the stop adjustment screw to the right controls the clockwise end of travel position, normally the fully closed position. The stop adjustment screw to the left controls the counter-clockwise end of travel position, normally the fully opened position.
3. Cycle the actuator/valve to the clockwise end of travel position and determine if the valve is in the proper position, in most applications this will be the fully closed position.

   If the valve is not in the correct clockwise position, disconnect the pressure and turn the right stop adjustment screw IN to reduce actuator travel, or Out to increase actuator travel.
4. When the correct clockwise position is obtained, hold the adjusting screw stationary while tightening the lock nut.
5. Cycle the actuator/valve to the counter-clockwise end of travel position and determine if the valve is in the proper position, in most applications this will be the fully opened position.

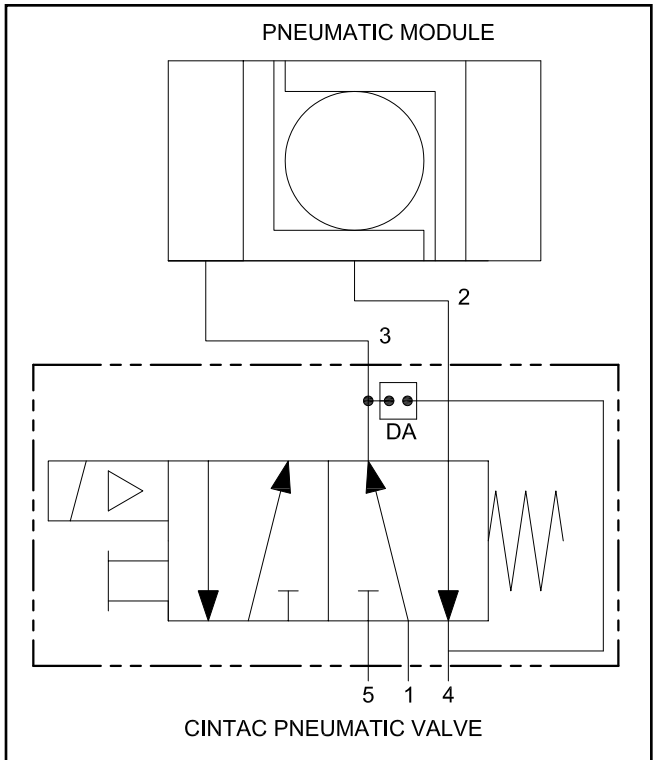
   If the valve is not in the correct counter-clockwise position, disconnect the pressure turn the left stop adjustment screw IN to reduce actuator travel, or OUT to increase actuator travel.
6. When the correct counter-clockwise position is obtained, hold the adjusting screw stationary while tightening the lock nut.

4.2 Setting the Visual Indicator

1. Disconnect the air supply
2. Using a M4 hex allen wrench, loosen the four captive Cintac Cover Screws (2.1), and remove the CCM Cover (2.2).
3. Using a M4 hex allen wrench, loosen the four captive Cintac Cover Screws (2.3), and remove CCM Body (2.4).
4. Remove Clear Visual Indicator Cover (2.6).
5. Using a M4 hex allen wrench, loosen the Flat HD Screw (13) which secures the Visual Indicator (2.7) to the Pneumatic Model enough so that it is able to rotate.
6. With the actuator in the closed position, center the Visual Indicator (2.7) until the "OPEN" quadrant is centered between the "V.I INDEX" markings on the CCM Manifold Plate (2.14). Tighten down the Flat HD Screw (13) to secure position.
7. Replace Clear Visual Indicator Cover (2.6) over Visual Indicator (2.7).



Spring-Return Actuator with Rebreather Open
Figure 2



Double-Acting Actuator with Rebreather Closed
Figure 3

8. Reattach the CCM Body (2.4) using the four captive Cintac Cover Screws (2.3). Tighten to 44 – 53 in-lbs. (5 – 6 N•m)

9. Reattach the CCM Cover (2.2) using the four captive Cintac Cover Screws (2.1). Tighten to secure.

4.3 Setting the Sensor Settings of the Comunications and Control Module

1. Operate the actuator to the closed position. Press and hold "Closed Set" button until "Closed LED is lit (2 seconds). Then release button.

2. Operate actuator to the open position. Press and hold "Open Set" button until "Open LED is lit (2 seconds). Release button.

NOTE: the set points are retained even after power is removed.

5 REPAIR KITS/SPARE PARTS

Service kits are available to replace the seals and bearings of the Pneumatic Module. These kits are listed in **(Table 1)**. Refer to IMO-528 when servicing the Pneumatic Module. There is also a service kit to replace the components of the solenoid. This service kit is CT604470 and consists of spool, cages, o-rings (pre-lubricated) and spring.

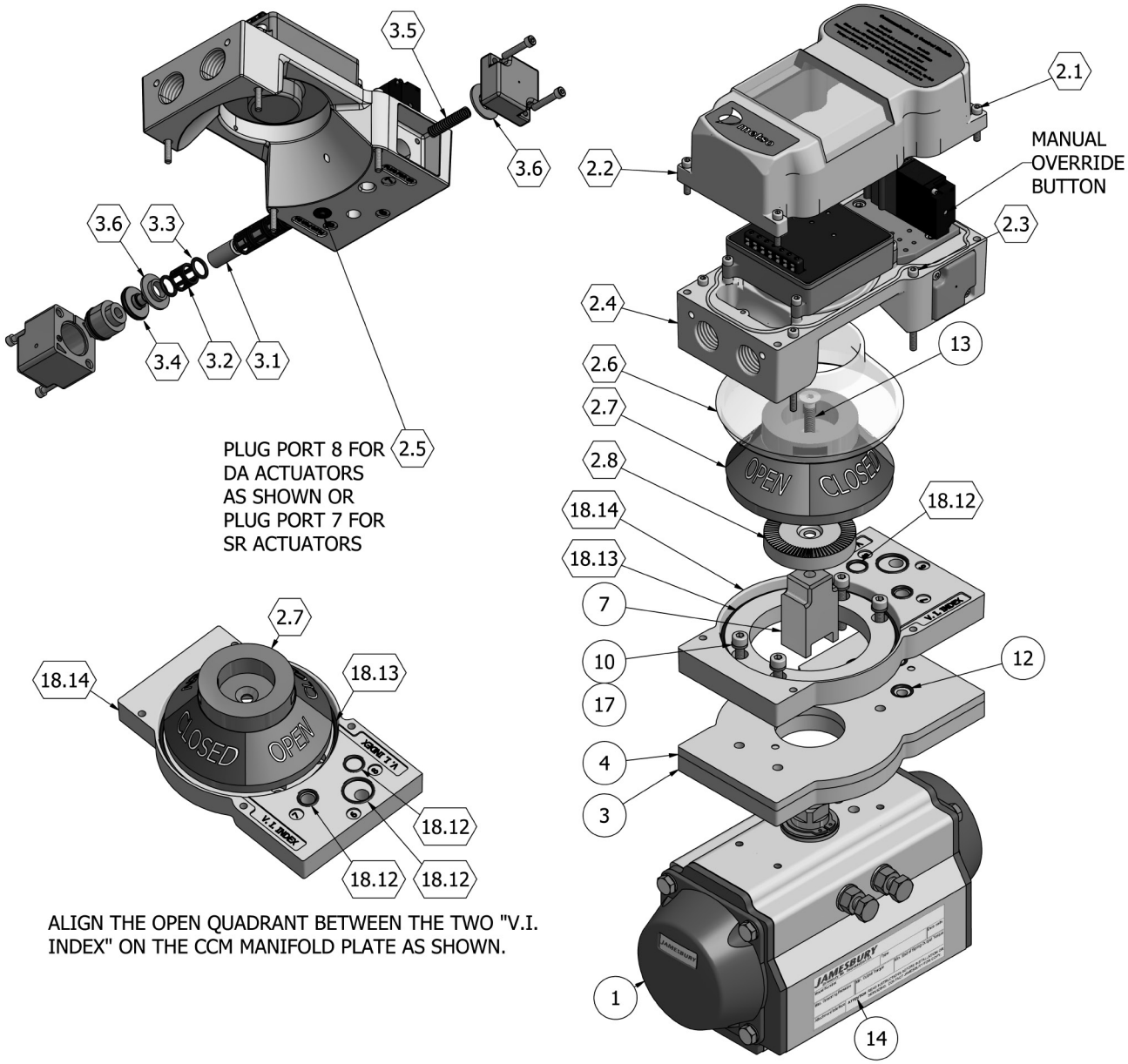
TABLE 1

Complete Service Kit			
Actuator	**Standard**	**High Temp.**	**Low Temp.**
CT100	RKP-154	RKP-234	RKP-249
CT200	RKP-155	RKP-235	RKP-250
CT250	RKP-156	RKP-236	RKP-251
CT300	RKP-157	RKP-237	RKP-252
CT400	RKP-159	RKP-239	RKP-254
CT500	RKP-161	RKP-241	RKP-256
CT600	RKP-163	RKP-243	RKP-258
CT650	RKP-164	RKP-244	RKP-259

PARTS LIST AND BILL OF MATERIALS

Item	Part Name	Material	CT100 through CT500 Quantity	CT600 and CT650 Quantity
1	Pneumatic Module		1	1
	Body	Anodized Aluminum PTFE Coated		
	End Caps	Aluminum Polyester Coated		
	Output Shaft	Plated Carbon Steel		
2	Communication And Control Module	See Section Below	1	1
3	Manifold Base	Anodized Aluminum With Epoxy Coated	1	1
4	Manifold	Cover Anodized Aluminum With Epoxy Coated	1	1
5	O-Ring Seal 1 (Port 4)	Nitrile Rubber	1	1
6	O-Ring Seal 2 (Port 2)	Nitrile Rubber	1	1
7	Coupling Adapter	Anodized Aluminum	1	1
8	Manifold Adapter	Anodized Aluminum With Epoxy Coated	1	1
9	Socket Head Cap Screw M5 X 10mm	Stainless Steel	2	6
10	Socket Head Cap Screw M5 X 30mm	Stainless Steel	4	4
11	O-Ring	Nitrile Rubber	2	4
12	O-Ring	Nitrile Rubber	3	3
13	Flat Headd Screw M6 X 50mm	Stainless Steel	1	1
14	Cintac Tag Polyester	Aluminum Foil	1	1
15	Cintac Label Polyester	Aluminum Foil	1	1
16	Spring Cartridge	Alloy Steel Epoxy Coated	See Note	See Note
17	Lock Washer	Stainless Steel	4	4
	Communication And Control Module			
2.1	CCM Mounting Screws	Stainless Steel	4	4
2.2	CCM Cover	Polycarbonate	1	1
2.3	CCM Body Screws	Stainless Steel	4	4
2.4	CCM Body	Die-Cast Aluminum With Epoxy Coated	1	1
2.5	DA/SR Plug	Anodized Aluminum	1	1
2.6	Visual Indicator Cover	Polycarbonate	1	1
2.7	Visual Indicator	Polysulphone	1	1
2.8	Visual Indicator Coupling	Polysulphone	1	1
18.12	Manifold Plate Orifice O-Rings	Nitrile Rubber	3	3
18.13	Visual Indicator Cover O-Ring	Nitrile Rubber	1	1
18.14	CCM Manifold Plate Die-Cast	Aluminum With Epoxy Coated	1	1
3.1	Spool.	Anodized Aluminum With Epoxy Coated	1	1
3.2	Cages	Polysulphone	5	5
3.3	O-Rings	Nitrile Rubber	7	7
3.4	O-Ring For Piston	Nitrile Rubber	1	1
3.5	Spring	Music Wire	1	1
3.6	Spool Guides	Stainless Steel	2	2

NOTE: DA=0 SR4/5=9 SR6=12·



Exploded View
Figure 4

HOW TO ORDER

To specify a complete Cintac Advanced Automation System, simply make a selection from the code boxes below. First select the code from the Pneumatic Module and then from the Communication and Control Module.

EXAMPLE: to select a Pneumatic Module consisting of a CT300SR4/5 that is to be fail open (O) have 100% adjustable stops (A) and also have the Low Temperature Option (L) and a Communication and Control Module 331HA02SRMT you would specify CT300SR4/5OAL-331HA02SRMT.

Pneumatic Module						Communication and Control Module						
1	2	3a	3b	3c	—	4	5	6	7	8	9	10
CT300	SR4/5	O	A	L	—	33	1H	A	02	S	RM	T

Pneumatic Module

1	Size
CT100	
CT200	
CT250	
CT300	
CT400	
CT500	
CT600	
CT650	

2	Series
DA	Double-Acting Pneumatic Module
SR4/5	Spring-Return 60-psi (4.1 bar) Pneumatic Module Spring-to-Close (CW Rotation)
SR6	Spring-Return 80-psi (5.5 bar) Pneumatic Module Spring-to-Close (CW Rotation)

3	Options
O	Spring-to-Open (CCW Rotation)
A	100% Adjustable Travel Stop
L	Low-Temperature Rating: -40˚F to +120˚F (-40˚C to +49˚C) Requires Communication and Control Module Option "T"

Note: Locking Kits and Declutchable Manual Overrides are available but must be ordered separately.

Communication and Control Module

4	Function
	Sensor Module
33	(2) SST Sensors
44	(2) Namur Sensors (I.S.; DIN 19234)
	Valve Communication Terminals (VCT)
92	DeviceNet VCT
93	FOUNDATION Fieldbus VCT (Bus Powered; I.S.)
94	FOUNDATION Fieldbus VCT (Externally Powered)
95	Modbus VCT
96	AS-Interface VCT
97	AS-Interface VCT (with Extended Addressing)

Communication and Control Module

5	Pneumatic Valve with No External Override
1H	24 VDC/120 VAC Universal (Use with Function option 33)
1D	24 VDC (0.5 watt) (Use with Function option 96 and 97)
1B	24 VDC (1.8 watt) (Use with Function option 92, 94, 95 and 96)
1E	12 VDC Intrinsically Safe (Use with Function option 44)
1A	Single Piezo Spring Return Intrinsically Safe or Standard (Use with Function option 93)
	Pneumatic Valve with Momentary External Override
3H	24 VDC/120 VAC Universal (Use with Function option 33)
3D	24 VDC (0.5 watt) (Use with Function option 96 and 97)
3B	24 VDC (1.8 watt) (Use with Function option 92, 94, 95 and 96)
3E	12 VDC Intrinsically Safe (Use with Function option 44)
3A	Single Piezo Spring Return Intrinsically Safe or Standard (Use with Function option 93)
	Pneumatic Valve with Latching External Override
5H	24 VDC/120 VAC Universal (Use with Function option 33)
5D	24 VDC (0.5 watt) (Use with Function option 96 and 97)
5B	24 VDC (1.8 watt) (Use with Function option 92, 94, 95 and 96)
5E	12 VDC Intrinsically Safe (Use with Function option 44)
5A	Single Piezo Spring Return Intrinsically Safe or Standard (Use with Function option 93)

6	Enclosures
A	North American (NEC/CEC)
V	International (IEC)

7	Conduit / Connectors
02	(2) 1/2" NPT
05	(2) M20
10	(1) 4-Pin Mini Connector
11	(1) 5-pin Mini Connector
13	(1) 4-pin Micro Connector
15	(1) 5-pin Micro Connector

8	Capabilities
S	Standard
D	Diagnostics (Use with Function 96 and 0.50 watt pneumatic valve 1D, 3D or 5D)

9	Visual Indicator
RM	Red Closed/Green Open

10	Options
T	Low Temperature Solenoid (Used with Pneumatic Module Option "L")

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