

James Cox and Son's CS 7588

**Mechatronics/Hydraulic Trainer
Manual**



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Contents

Page 1	Introduction
Page 2	CS 7588 Specifications
Page 3	CS 7588 General Overview
Page 4	CS 7588 Recommended Startup Procedures
Page 5.....	Vender Parts
Page 7	Manufactured Parts
Page 8	7588-020-1 Electrical Schematic
Page 9	7588-020-2 Electrical Schematic
Page 10	7588-021 Hydraulic Schematic.pdf
Page 11	7588-021-B Hydraulic Schematic.pdf

CS 7588 Mechatronics/Hydraulic Trainer

The CS 7588 Hydraulic Training System was required to meet the following criteria:

- Incorporate features found in typical industrial hydraulic systems.
- Utilize only industry standard components.
- Operate manually as a standalone unit.
- Quickly convertible to PLC control.
- Integrate a variable frequency drive (VFD) driven pump motor.
- Operate on 120 VAC 60 Hz.
- Incorporate a full set of expansion ports.
- Easily portable to other training sites.
- Small and stackable to conserve space.
- Reasonably priced.

CS 7588 Mechatronics/Hydraulic Trainer

CS 7588 Specifications:

115V 60 Hz 4 Amp
Chevron Hydraulic Oil ISO 46 or equivalent
1.4 U.S. Gallon 5.31 liters

CS 7588 Factory Settings:

CS7588-013 TECO FM50 AC DRIVE

TECO FLUXMASTER FM 50 AC DRIVE			
F_##	FACTORY SETTING	F_##	FACTORY SETTING
F_01	5.0	F_16	1.5 Hz
F_02	5.0	F_17	8.0 %
F_03	0	F_18	100 %
F_04	0	F_19	2
F_05	004	F_20	5
F_06	60 Hz	F_21	3
F_07	15 Hz	F_22	1
F_08	10 Hz	F_23	0
F_09	6 Hz	F_24	0
F_10	1	F_25	020
F_11	1	F_26	20
F_12	5	F_27	30
F_13	0.0%	F_28	
F_14	0	F_29	
F_15	0.55	F_30	

CS7588-011 RELIEF VALVE

- Set to maintain 200 PSI at 15 Hz.

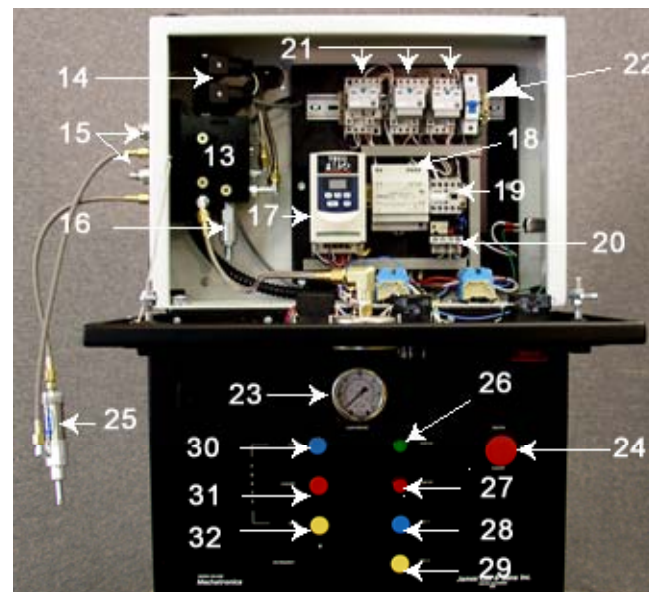
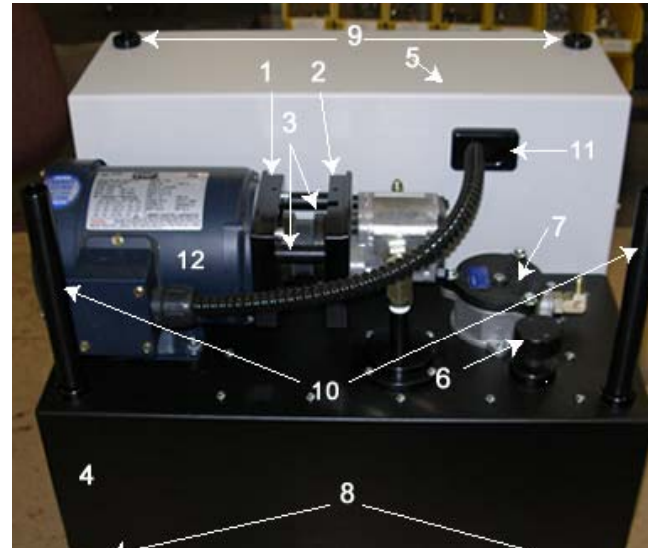
CS7588-012 FLOW CONTROL VALVES

- Set for slow smooth action of ram in both directions.

CS 7588 Mechatronics/Hydraulic Trainer

CS 7588 General Overview:

1. 7588-002 PUMP ADAPTER MOTOR SIDE
2. 7588-003 PUMP ADAPTER PUMP SIDE
3. 7588-004 STANDOFFS
4. 7588-005 RESERVOIR OUTER CASE
5. 7588-008 ELECTRICAL CONTROL CASE
6. 7588-011 FILLER AND BREATHER CAP
7. 7588-012 SUCTION FILTER CAP
8. 7588-013 CONNECTING FEET
9. 7588-014 TOP CONNECTING PINS
10. 7588-015 CONNECTING RODS
11. 7588-016 HYDRAULIC HOSE FEED THRU
12. CS7588-005 3 PHASE 60HZ MOTOR (LEESON)
13. 7588-001 HYDRAULIC MANIFOLD M0-001
14. CS7588-010 SOLENOID VALVE
15. CS7588-012 FLOW CONTROL VALVES
16. CS7588-011 RELIEF VALVE
17. CS7588-013 TECO FM50 AC DRIVE
18. CS7588-016 DC SWITCHING POWER SUPPLY
19. CS7588-014 TECO IEC CONTACTOR
20. CS7588-069 OVERLOAD RELAY *1 (**SEE NOTE**)
21. CS7588-026 RELAYS 1,2 & 3
22. CS7588-066 MINIATURE CIRCUIT BREAKER 6 AMP
23. CS7588-042 PRESSURE GAUGE
24. CS7588-017 POWER ON / EMERGENCY STOP 22MM NON-METALLIC MUSHROOM OPERATOR
25. CS7588-072 "500" HYDRAULIC CYLINDERS
26. CS7588-021 PUMP START SWITCH
27. CS7588-060 PUMP OFF SWITCH
28. CS7588-061 AUXILLARY SWITCH 1
29. CS7588-062 AUXILLARY SWITCH 2
30. CS7588-022 C1 ON
31. CS7588-060 C1 OFF SWITCH
32. CS7588-022A C1 ON



NOTE: CS7588-069 OVERLOAD RELAY Is used for training purposes only it will not shut down power to the Inverter drive, but it only disconnects power from the C1 – C2 control circuit in order to show that if the system current exceeds the set value on the CS7588-069 OVERLOAD RELAY it will trip. If there is a motor overload condition should occur the FM 50 Inverter Drive would trip and display the fault code.

CS 7588 Mechatronics/Hydraulic Trainer

CS 7588 Recommended Startup Procedures

1. Check the oil level in sight glass located at the right hand end of unit if facing the front. (Should be at approximately even with the 160° on the thermometer.)
2. Check that all hoses are connected and that there are no visible leaks.
3. Check that the Mushroom main power switch is in the off position. This is a Main Power/Emergency Stop button only and is not intended to turn the pump on and off; doing so can cause a fault problem with the TM 50 Drive.
4. Connect power cord and plug into 115V receptacle.
5. Turn the speed control all the way down to 0.

Note: With the speed control set at 0 the motor will run at 15 Hz. When the pump switch is turned on.

6. Twist the mushroom shaped power button to turn on. The Green light on front panel should come on and the TECO TM 50 inverter should energize. If you open the CS7588 front panel you should see the display on the TM 50 flashing 15. This is showing that the unit is energized and that the low speed is correctly set at 15 Hz. (The low speed is set at 15 Hz so the motor will not overheat due to lack of airflow over the armature.)
7. Check that both the yellow and blue lights on front panel are off. If either one is on press the non-illuminated red button to de-energize the solenoids.
8. Check for leaks, then using the yellow and blue and red control switches operate ram or a hydraulic motor depending upon your application.

CS 7588 Vendor Parts

Qty	P/N	Title
1	CS7588-003A	1/2 SURE-FLEX FLANGE
1	CS7588-004A	SURE-FLEX SLEEVE EPDM
1	CS7588-005	3 PHASE 60HZ MOTOR (LEESON)
1	CS7588-006	SUMP STRAINER
1	CS7588-007	3/8" NPT BREATHER
1	CS7588-008	FILTER
1	CS7588-009	FILTER ELEMENT
2	CS7588-010	SOLENOID VALVE
1	CS7588-011	RELIEF VALVE
1	CS7588-012	FLOW CONTROL VALVE
1	CS7588-013	TECO FM50 AC DRIVE
1	CS7588-014	TECO IEC CONTACTOR
1	CS7588-016	DC SWITCHING POWER SUPPLY
1	CS7588-017	22MM NON-METALLIC MUSHROOM OPERATOR
6	CS7588-018	22MM NON-METELLIC, SINGLE CONTACT BLOCK
3	CS7588-019	22MM NON-METELLIC, SINGLE CONTACT BLOCK
1	CS7588-020	22MM NON-METALLIC, ILLUMINATED EXTENDED OPERATOR
1	CS7588-021	22MM NON-METALLIC, ILLUMINATED EXTENDED OPERATOR
1	CS7588-022	SWITCH (BLUE)
1	CS7588-022A	SWITCH (YELLOW)
1	CS7588-023	LED BLOCK
1	CS7588-024	LED BLOCK
1	CS7588-025	LED BLOCK
3	CS7588-026	RELAY
3	CS7588-027	RELAY SOCKET
2	CS7588-028	DIODE SURGE SUPPRESSOR
1	CS7588-030	GEAR PUMP .07 CID
1	CS7588-032	ALUMINUM THREADED PIPE
1	CS7588-032C	ALUMINUM THREADED PIPE
1	CS7588-033	90 MALE BOSS O-RING - FEMALE PIPE ELBOW
1	CS7588-034	90 MALE BOSS O-RING - MALE J.I.C. ELBOW
1	CS7588-035	LEVEL GAUGE, 3" W/THERMOMETER
8	CS7588-036	HEX THIN JAM NUT
1	CS7588-037	HEX THIN JAM NUT
1	CS7588-039	PEM SELF-CLINCHING BLIND FASTENERS
1	CS7588-040	PEM SELF-CLINCHING FASTENERS
1	CS7588-041	PEM SELF-CLINCHING FASTENERS
1	CS7588-042	PRESSURE GAUGE
1	CS7588-044	SLOTTED PVC WIRE DUCT
1	CS7588-045	LIQUID-TIGHT FITTING
1	CS7588-051	HOSE ASSEMBLY (GATC)
2	CS7588-052	HOSE ASSEMBLY (GATC)
1	CS7588-053	HOSE ASSEMBLY (GATC)
1	CS7588-054	HOSE ASSEMBLY (GATC)
1	CS7588-055	FLANGE MOUNT POWER ENTRY MODULE
1	CS7588-057	POWER CORD

CS 7588 Vendor Parts

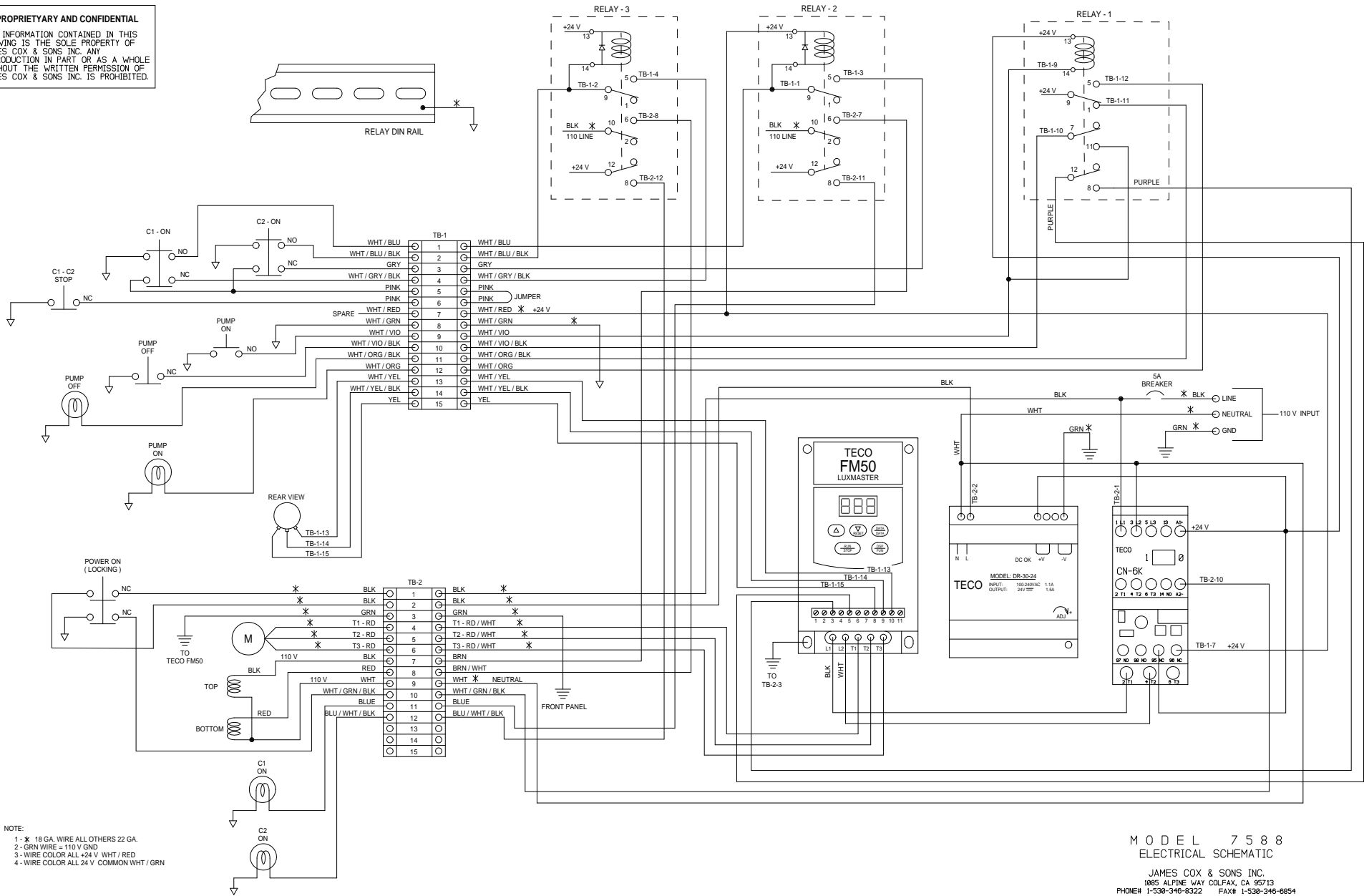
- 1 CS7588-058 DIN-RAIL TERMINAL BLOCK
- 1 CS7588-059 DIN-RAIL TERMINAL BLOCK
- 1 CS7588-060 22mm NON-METALIC, FLUSH OPERATOR
- 1 CS7588-061 22mm NON-METALIC, FLUSH OPERATOR
- 1 CS7588-062 22mm NON-METALIC, FLUSH OPERATOR
- 1 CS7588-063 DIN-RAIL TERMINAL BLOCK, END BRACKET
- 1 CS7588-066 MINIATURE CIRCUIT BREAKER
- 1 CS7588-067 90 MALE O-RING-MALE JIC ELBOW-LONG DROP
- 2 CS7588-068 DIN PLUG
- 1 CS7588-069 OVERLOAD RELAY
- 1 CS7588-070 DIN-RAIL
- 1 CS7588-070A DIN-RAIL
- 1 CS7588-071 LED BLOCK
- 1 CS7588-072 "500" HYDRAULIC CYLINDERS
- 12 CS7588-074 RECESSED BOSS PLUG
- 2 CS7588-078 90 MALE BOSS O-RING - MALE J.I.C. ELBOW
- 1 CS7588-080 HELICAL BUNDLING WRAP
- 1 CS7588-081 90 MALE BOSS O-RING - MALE J.I.C. ELBOW

CS 7588 Manufactured Parts

Qty	P/N	Title
1	7588-001	HYDRAULIC MANIFOLD M0-001
1	7588-002	PUMP ADAPTER MOTOR SIDE
1	7588-003	PUMP ADAPTER PUMP SIDE
4	7588-004	STANDOFFS
1	7588-005	RESERVOIR OUTER CASE
1	7588-006	RESERVOIR TANK
1	7588-007	PUMP,MOTOR,SUPPORT BRACKET
1	7588-008	ELECTRICAL CONTROL CASE
1	7588-009	ELECTRICAL CONTROL FRONT PANEL
1	7588-010	COMPONENT SUB PANEL
1	7588-011	FILLER AND BREATHER CAP
1	7588-012	SUCTION FILTER CAP
4	7588-013	CONNECTING FEET
4	7588-014	TOP CONNECTING PINS
4	7588-015	CONNECTING RODS
3	7588-016	HYDRAULIC HOSE FEED THRU
1	7588-017	PANEL HINGE
1	7588-018	PUMP SPROCKET COVER

PROPRIETARY AND CONFIDENTIAL

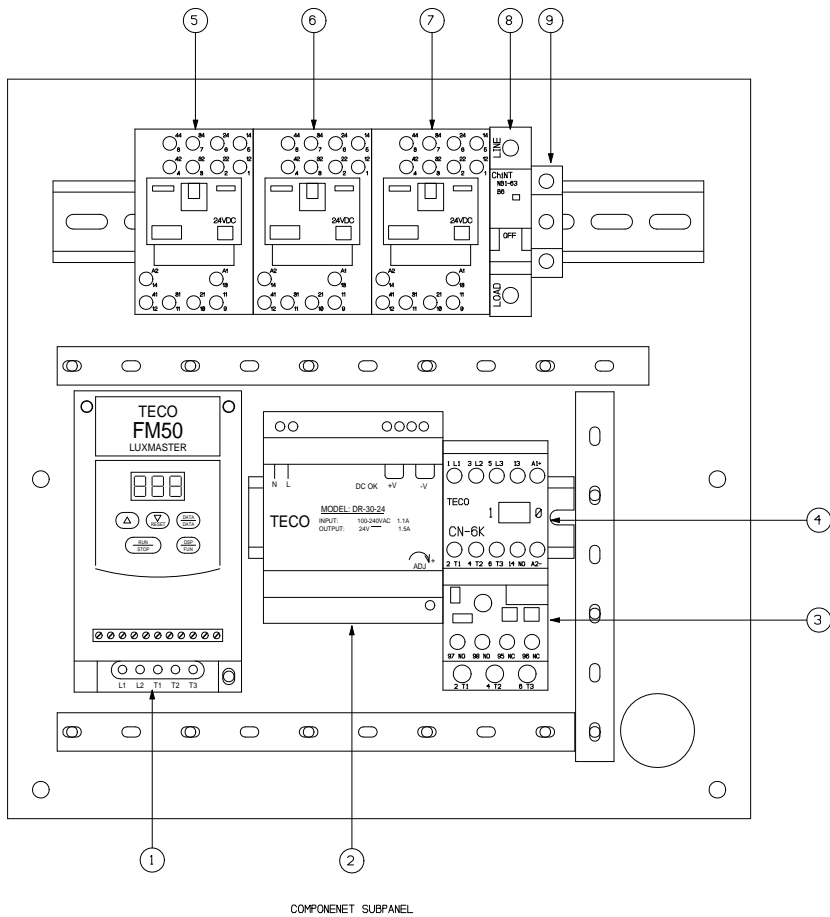
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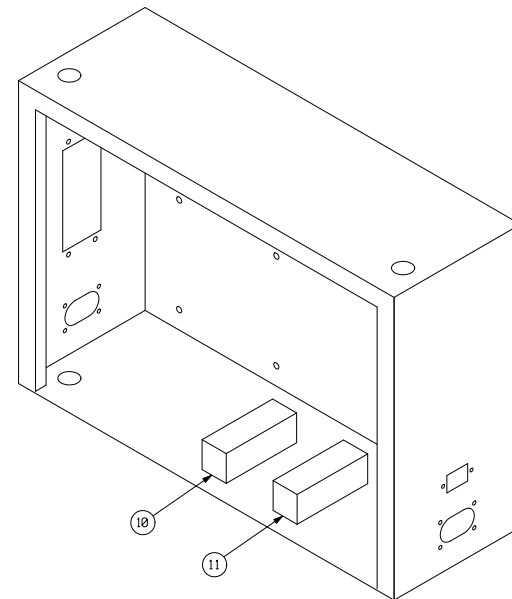
NOTE:
 1 - * 18 GA. WIRE ALL OTHERS 22 GA.
 2 - GRN WIRE = 110 V GND
 3 - WIRE COLOR ALL +24 V WHT / RED
 4 - WIRE COLOR ALL 24 V COMMON WHT / GRN

MODEL 7588
ELECTRICAL SCHEMATIC

JAMES COX & SONS INC.
 1865 ALPINE WAY COLFAX, CA 95713
 PHONE# 1-530-346-6322 FAX# 1-530-346-6654



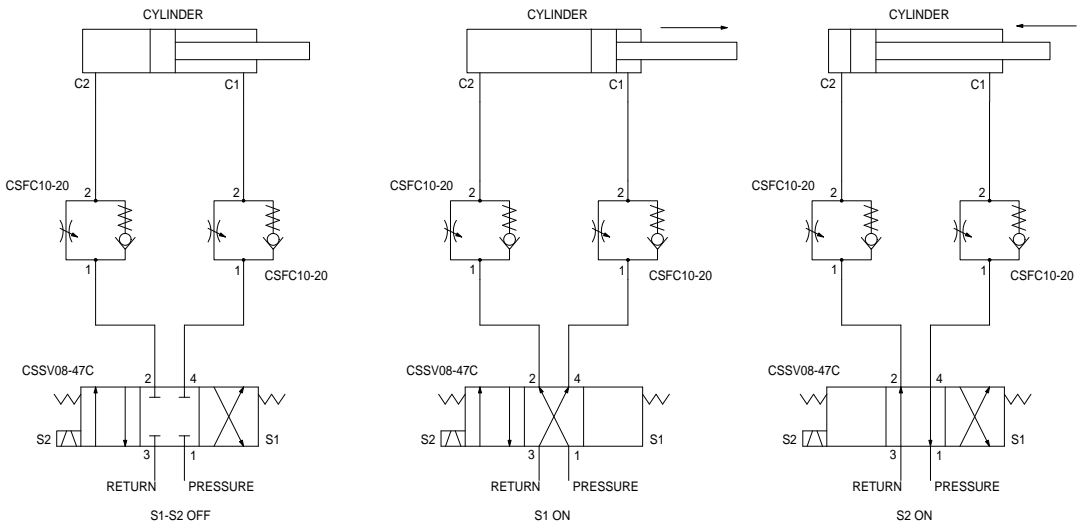
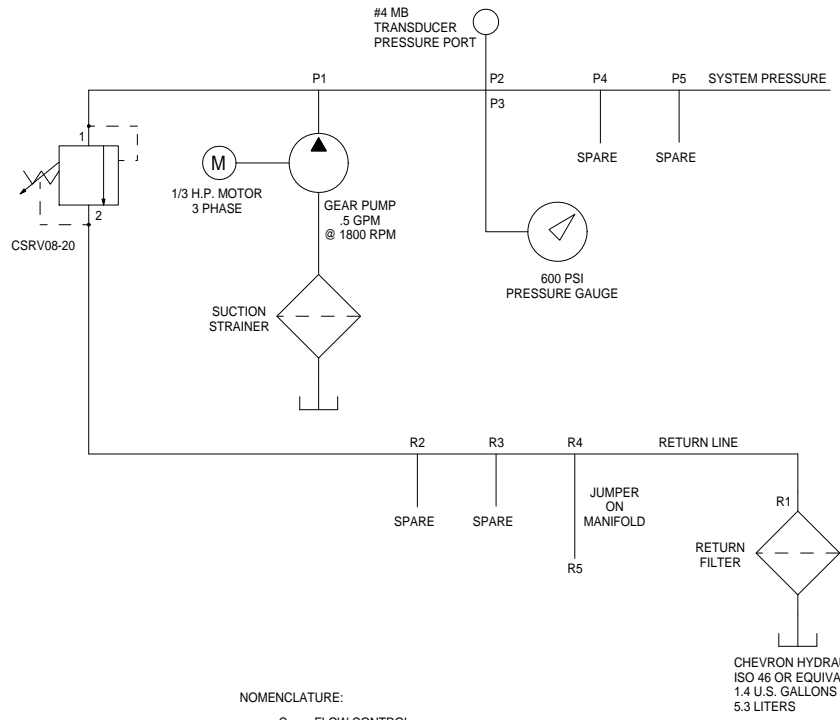
- 1 AC DRIVE
- 2 24V POWER SUPPLY
- 3 THERMO OVERLOAD
- 4 CONTACTOR
- 5 RELAY #1
- 6 RELAY #2
- 7 RELAY #3
- 8 CIRCUIT BREAKER
- 9 GROUNDING BLOCK
- 10 TERMINAL BLOCK #1
- 11 TERMINAL BLOCK #2



ELECTRICAL CASE

MODEL 7588
ELECTRICAL COMPONENT LAYOUT

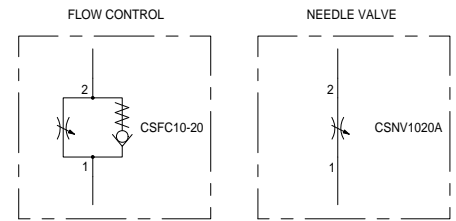
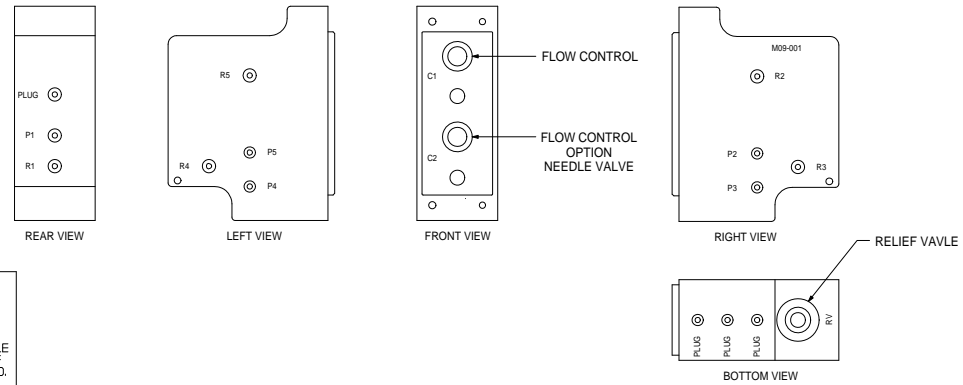
JAMES COX & SONS INC.
1865 ALPINE WAY COLFAX, CA 95713
PHONE# 1-530-346-6322 FAX# 1-530-346-6654



METER OUT CIRCUIT

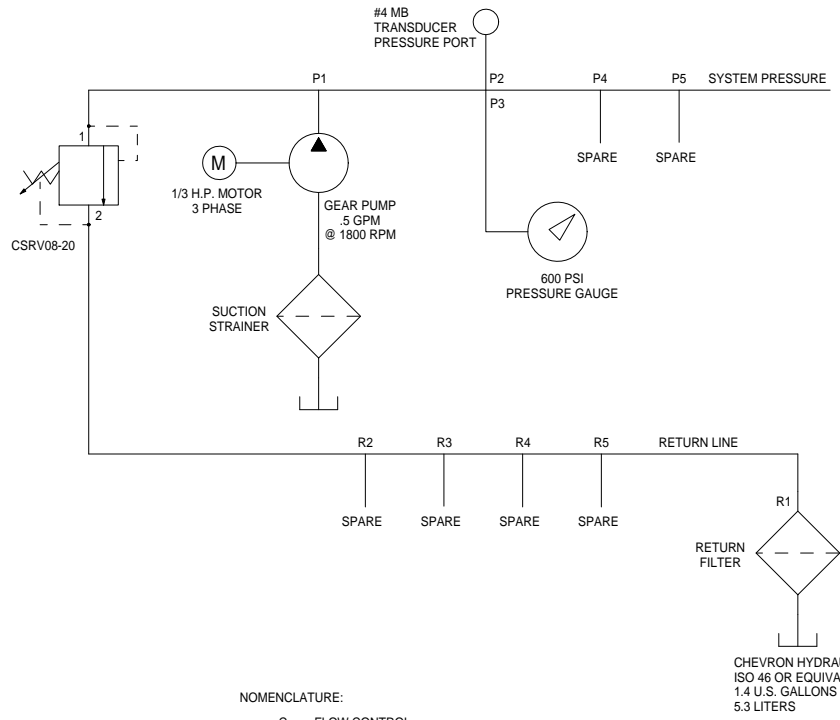
- NOMENCLATURE:**
- C = FLOW CONTROL
 - P = PRESSURE PORTS
 - R = RETURN PORTS
 - RV = RELIEF VALVE
 - SV = SOLENOID VALVE
- ALL OTHERS ARE PORT PLUGS

HYDRAULIC MANIFOLD



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HYDRAULIC SCHEMATIC
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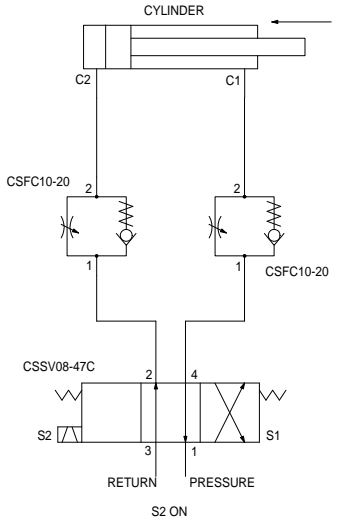
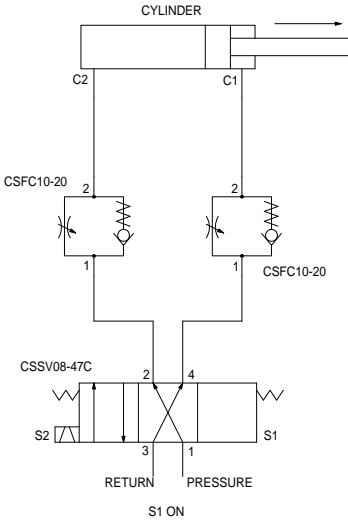
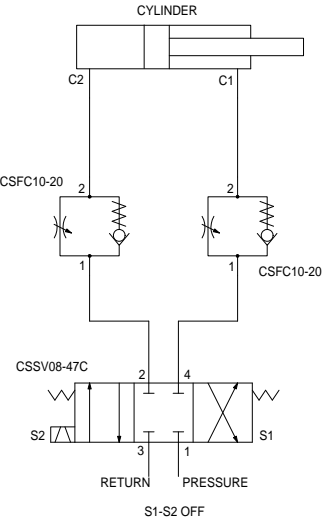
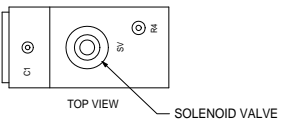
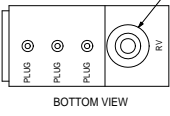
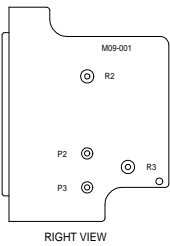
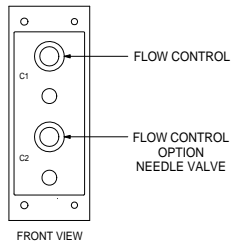
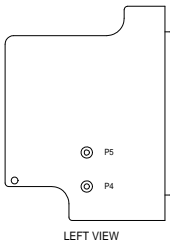
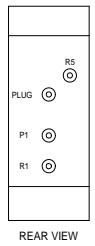


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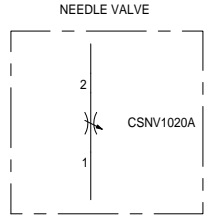
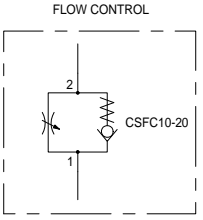
C = FLOW CONTROL
P = PRESSURE PORTS
R = RETURN PORTS
RV = RELIEF VALVE
SV = SOLENOID VALVE

ALL OTHERS ARE PORT PLUGS

HYDRAULIC MANIFOLD



METER OUT CIRCUIT

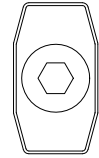
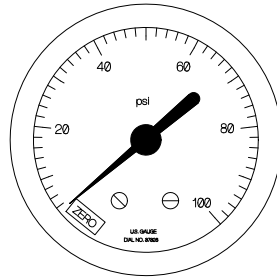
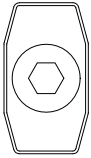


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MODEL 7588-B
HYDRAULIC SCHEMATIC

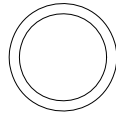
JAMES COX & SONS INC.
1085 ALPINE WAY COLFAX, CA 95713
PHONE# 1-530-346-8322 FAX# 1-530-346-6854



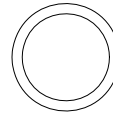
PUMP PRESSURE

P
O
R
T
S

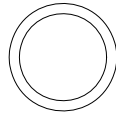
C1 ON



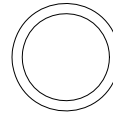
PUMP ON



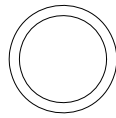
C1/C2 OFF



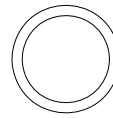
PUMP OFF



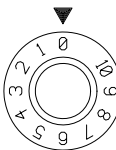
C2 ON



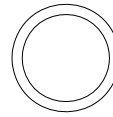
AUX - 1



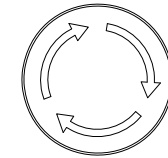
VFD FREQUENCY



AUX - 2



TWIST/ON



POWER

PUSH/OFF

MODEL C S 7 5 8 8
Hydraulic Trainer

James Cox & Sons Inc.
COLFAX CALIFORNIA
USA