

January 2005

## FT90 Reduced Voltage - Soft Start



## Product Description

The Automatic Transfer Switch Option may be added to any FD type Fire Pump Controller whenever automatic transfer from normal to alternate power is required. The automatic Transfer Switch and Fire Pump Controller are each mounted in separate enclosures to form one unit and interwired.

### Test Switch

A test switch is provided on the outside of the controller that can be used to simulate the loss of power on the normal source. As well, a silence pushbutton is provided which de-energizes the alarm bell.

## Product Features

The FT90 Transfer Switch Controller incorporates a solid state starter which provides a step-less, smooth current ramp to the motor. This characteristic eliminates current surges and mechanical torque transients. A soft stop feature allows for smooth deceleration of the motor thus eliminating water hammer throughout the cycle. The FT90 can be programmed for either fully automatic or semi-automatic operations.

### Microprocessor Control

EATON Cutler-Hammer LMR Transfer Switch Fire Pump Controllers are microprocessor based. All events surrounding the operation of the controller are stored within the memory, thus giving the ability to diagnose and troubleshoot problems based on an actual history of events. Events are time and date stamped.

A main display unit provides a read-out of parameters such as current pressure, volts and amps and will display error messages as well as provide alarm indication. A status report is available which provides a record of the current state of the controller. The report can be printed locally via the printer / recorder.

### NEMA 2 Enclosures

All LMR controllers come standard with NEMA 2 enclosures unless otherwise ordered. Available options include: NEMA 3R, 4, 4X, 12.

## Transfer Switch Features

### Electrically and Mechanically Interlocked

The FT Series transfer switch operating mechanisms are mechanically interlocked to prevent the normal and alternate source from connecting at the same time. The switch operates upon signals received from the MP1-E microprocessor.

### ATS - MP1-E

The microprocessor based MP1-E controller accurately monitors two power sources and provides the necessary intelligence to operate the transfer switch in an appropriate and timely manner.



### Keypad Programming

The MP1-E controller membrane is equipped with four keypad input buttons. In addition, a fifth user input exists via a rear located PC serial port connection, that can be used for programming of options and setpoints.

### Automatic Transfer

The FT Series Transfer Switches will perform an automatic transfer from Normal to Alternate source when the Voltage drops to 85% of normal, or there is a loss of any phase and/or Phase Reversal.



### Voltage & Frequency Sensing

The MP1-E continuously monitors the normal source for out of range setpoint values. When the source is outside the dropout setpoints, the source will become unavailable. This prompts a transfer to the alternate source. Retransfer occurs when the normal source's frequency and/or voltage return within pickup setpoints.

### Remote Alarm Contacts

Four remote alarm contacts are available for indication of  
 Connected to Normal Power  
 Connected to Alternate Source  
 Isolation Switch Open  
 Normal Power Failure

### LED Status Indication

Four LED's indicate the status of the power sources.  
 Source 1 Available      Source 1 Connected  
 Source 2 Available      Source 2 Connected

### Elapsed Time Meter

The LMR monitors and records the run time of the motor, in hours, whenever the pump is running. The actual run time can be viewed on the LCD display in 1 hour increments.

### Last 2048 Messages

The internal microprocessor stores the most recent 2048 messages in it's memory. The messages can be printed, viewed on the LCD screen or downloaded to a laptop. Each message is time and date stamped. The LCD display acts as a paperless chart recorder.



### LCD Message Retrieval

The 2 line liquid crystal display allows viewing of all messages and event information without opening the front door of the controller. Messages can also be downloaded to a laptop computer via the communications port located on the top of the main microprocessor board.

### Volts and Amps Display

The LCD display located on the main display panel, simultaneously indicates the voltage and amps on all three phases of power coming into the controller.

### Emergency Start Operator

A mechanically operated emergency start handle activates the motor contactor independent of any electrical control circuits or pressure switch input.



### Number of Operations Counter

The LMR controller monitors and records the number of times the pump has started. The actual count can be viewed on the LCD display.

### Run Period Timer

The run period timer is built into the LMR microprocessor and can be accessed via the membrane / keypad. It is programmable from 0-45 minutes and should be reset to ten (10) minutes when the controller is placed in service.

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## Product Features

## Additional Output Relay

An additional output relay labeled Future #1, can be user programmed to operate for nine (9) different functions. Programming is done in the LMR menu using the membrane / keypad.

## Common Alarm Relay and Contacts

The LMR controller has a common alarm relay which de-energizes whenever there are any alarm conditions present. This relay is energized under normal conditions and has LED status indication on the main relay board.

## Extra Set of Form-C Contacts for Phase Reversal and Phase Failure

The phase reversal and phase failure relays come standard with an extra set of contacts that can be used for remote alarm indication.

## Pressure Transducer: 0 - 600 psi

Each LMR controller is equipped with a stainless steel, 0-600 psi pressure switch capable of withstanding a momentary surge pressure of 1000 psi.

## NEMA Rated Contactors

NEMA rated Freedom or A200 Series EATON Cutler-Hammer contactors are used in all LMR fire pump controllers. A wide variety of coil voltages are available for domestic and international use.

## Status &amp; Alarm Indication



## Alarm &amp; Status Indication

The display panel is equipped with nine red Alarm LED's and nine green Status LED's which indicate various functions and operations of the controller. The membrane keypad has curved dome windows which allow viewing from a wide angle.

## Weekly Test Timer

The weekly test timer allows the user to set the controller to automatically start and stop the controller once per week. The number of weeks between tests is set via the front keypad. The weekly test date and time can be viewed on the LCD display.

## Sequential Start Timer

The sequential start timer is used to program a start delay after an automatic start request. This function is used for staging the start of pumps in a multiple pump application and also in Diesel backup applications.

## Printer / Recorder

The industrial grade thermal printer is housed in a rugged steel enclosure within the controller. The on/off switch, feed and reset buttons are front accessible. A bi-color status LED is also visible on the front of the printer. Green indicates - "Printer Operational" while yellow indicates - "Out of Paper".



## Technical Data and Specifications

## Line Terminals (Incoming Cables)

	Line Terminals on Main Isolation Switch (Incoming Cables)					Qty. & Cable Sizes	Service Entrance GND.LUG Qty. & Cable Sizes
	LINE VOLTAGE						
	200 - 208	220 - 240	* 380 - 415	440 - 480	550 - 600		
Max. Hp	30	30	60	75	100	(1)#14-1/0 PER Ø (CU/AL)	(1)#14-2/0 (CU/AL)
	40	40	100	100	-	(1)#4-4/0 PER Ø (CU/AL)	(1)#14-2/0 (CU/AL)
	75	75	150	200	200	(1)#3-350MCM Ø (CU/AL)	(1)#4-350MCM (CU/AL)
	100	125	200	250	300	(2)3/0-250MCM Ø (CU/AL)	(2)#4-350MCM (CU/AL)
	150	200	350	400	400	(2)250-350MCM Ø (CU/AL)	(2)#2-600MCM (CU/AL)

\* Coils available: 380V-50Hz, 380V-60Hz, 415V-50Hz, 415V-60Hz.

## Standards &amp; Certification

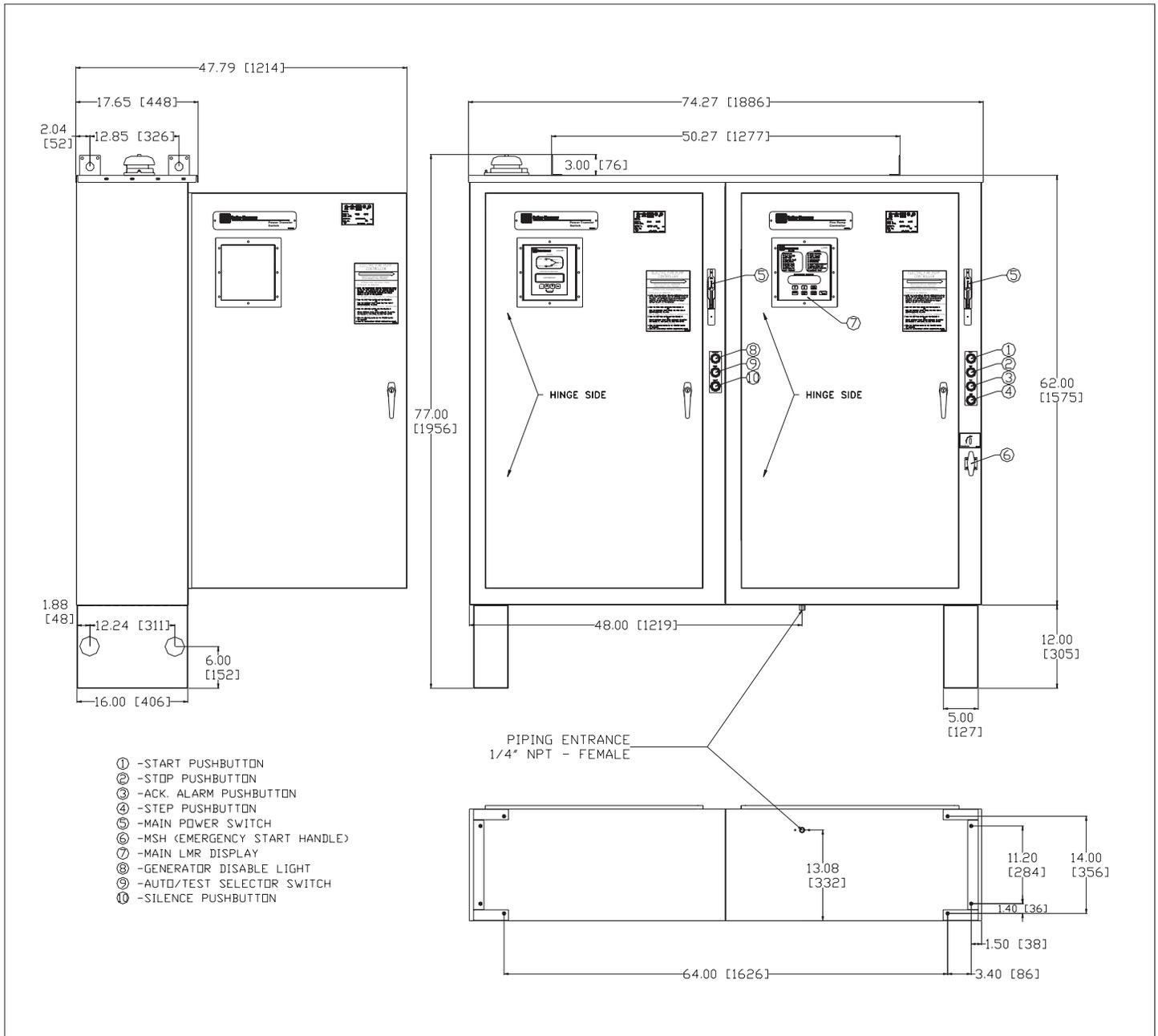
The LMR Electric Fire Pump Controllers meet or exceed the requirements of Underwriters Laboratories, Underwriters Laboratories Canada, Factory Mutual, the Canadian Standards Association, New York City building code, CE mark requirements and are built to NFPA 20 standards.



January 2005

**FT90 Reduced Voltage - Soft Start**

**Dimensions  
FT90 Soft Start**



Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)
		Standard	Intermediate	High	
5 - 40	200 - 208V	100,000	Consult Factory	Consult Factory	1155 (524)
5 - 50	220 - 240V		150,000	200,000	
5 - 75	* 380 - 415V				
5 - 100	440 - 480V				
5 - 125	550 - 600V	25,000	Consult Factory	Consult Factory	

\* Coils available: 380V-50Hz, 380V-60Hz, 415V-50Hz, 415V-60Hz.



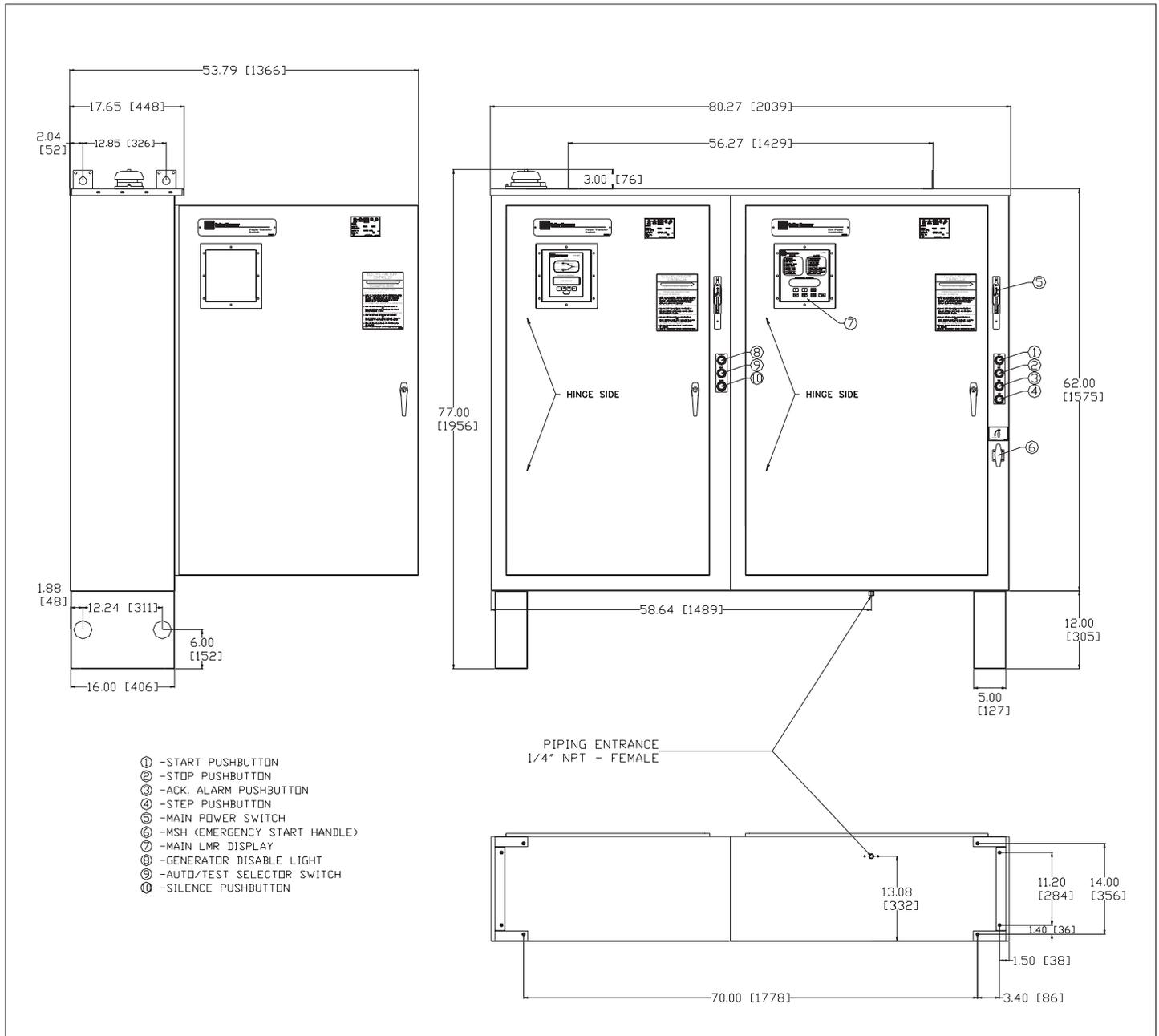
**NOTES:**

1. All enclosures finished in FirePump red.
2. Cable Entrance either top or bottom.
3. Standard Enclosure type NEMA 2.

FT90 Reduced Voltage - Soft Start

Dimensions

FT90 Soft Start



Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)
		Standard	Intermediate	High	
50 - 150	200 - 208V	100,000	Consult Factory	Consult Factory	1205 (547)
60 - 200	220 - 240V				
100 - 300	* 380 - 415V				
125 - 400	440 - 480V				
125 - 500	550 - 600V	25,000	35,000		

\* Coils available: 380V-50Hz, 380V-60Hz, 415V-50Hz, 415V-60Hz.



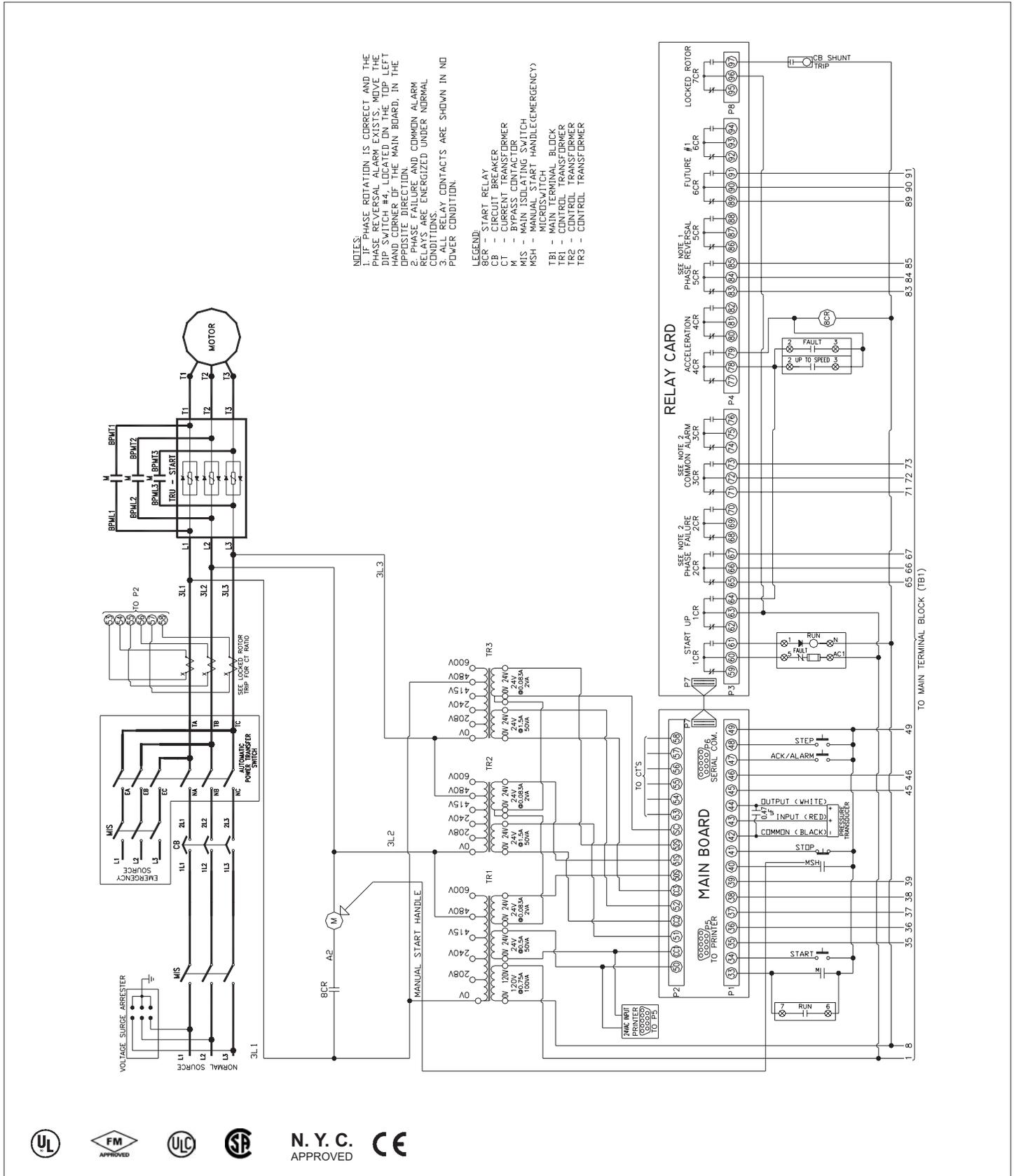
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Electrical Wiring Schematic  
FT90 Soft Start

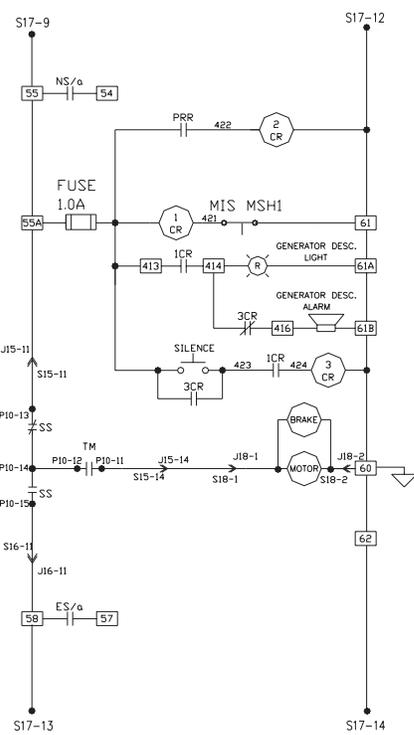
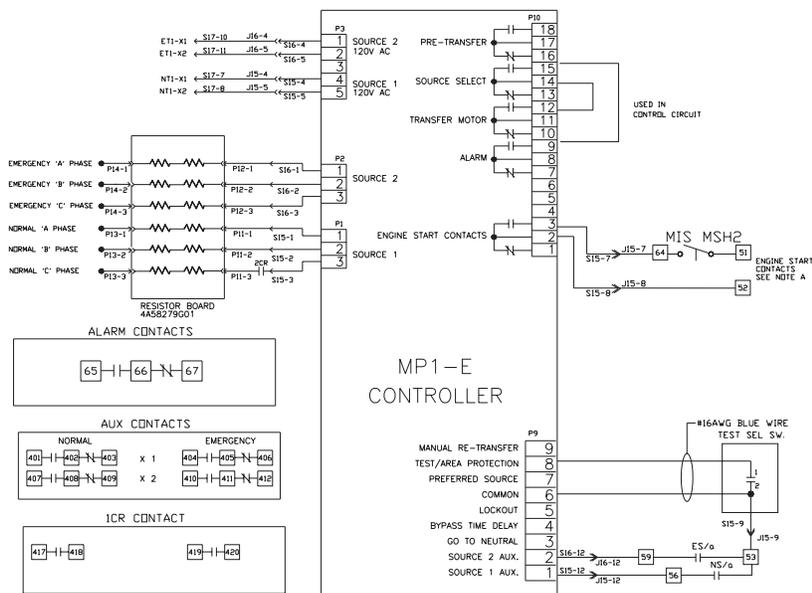
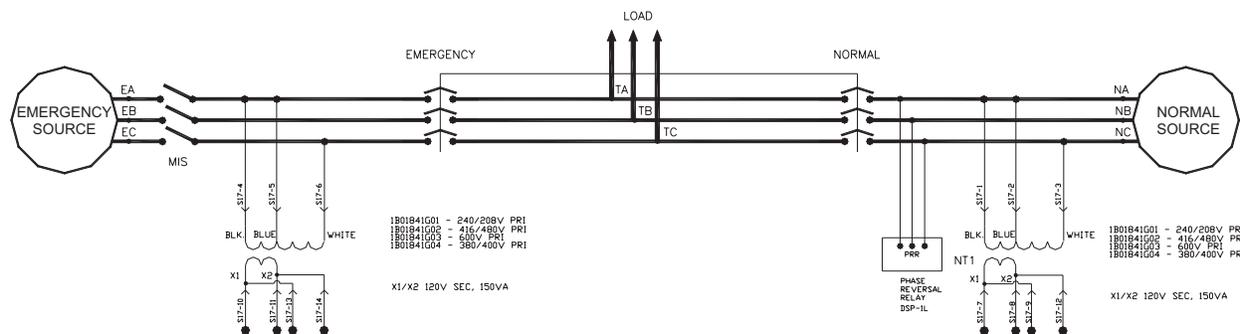


N. Y. C. APPROVED



FT90 Reduced Voltage - Soft Start

Electrical Wiring Schematic  
FT Automatic Power Transfer Switch



**NORMAL S15/J15 PINOUT**

1	4	7	10	13
EA	S17-7	P10-3	J15-10	P9-5
EB	NT1	X1	51	63
EC	5	8	11	14
	S17-8	P10-2	55	S18-1
	NT1	X2	53	M
	6	9	12	15
	NT1	X3	52	101
	7	10	13	
	P9-6	NS/0	101	

**EMERGENCY S16/J16 PINOUT**

1	4	7	10	13
EA	S17-10	P10-7	J16-10	P9-5
EB	E11	X1	57	63
EC	5	8	11	14
	S17-11	P10-8	58	S18-1
	E11	X2	53	M
	6	9	12	15
	NT1	X3	52	101
	7	10	13	
	P10-9	ES/0	PRE	

**TRANSFORMER S17/J17 PINOUT**

1	4	7	10	13
NA	EA	NT1	X1	E11
(BLK)	(BLK)	(BLK)	(BLK)	X3
2	5	8	11	14
NA	EA	NT1	X1	E11
(BLU)	(BLU)	(BLU)	(BLU)	X3
3	6	9	12	15
NC	EC	NT1	X3	E11
(WH)	(WH)	(WH)	(WH)	X4

- ESx - EMERGENCY AUXILIARY SWITCH
- Ex - EMERGENCY CUSTOMER CONNECTION
- NSx - NORMAL AUXILIARY SWITCH
- Nx - NORMAL CUSTOMER CONNECTION
- Jx - FEMALE CONNECTOR
- Px - BOARD EDGE CONNECTOR
- Sx - MALE CONNECTOR
- Tx - LOAD CUSTOMER CONNECTION

NOTE A: TERMINALS ARE TO BE CONNECTED TO REMOTE START CONTACT FROM GENERATOR

ATS SHOWN WITH SWITCH DE-ENERGIZED, IN NEUTRAL POSITION

FOR FURTHER DESCRIPTION OF OPERATION SEE I.L15.01.T.K.



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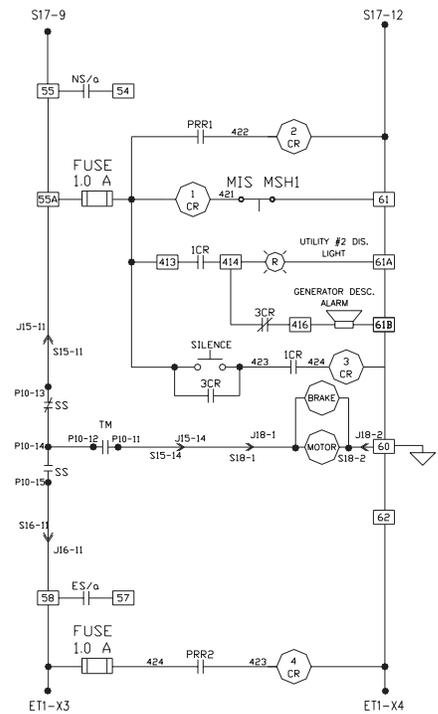
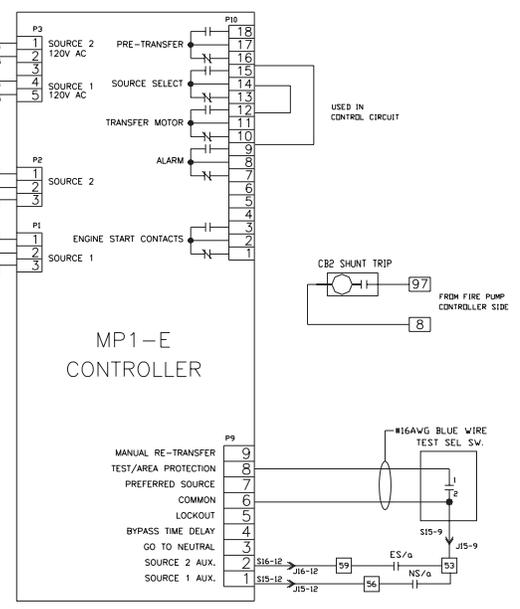
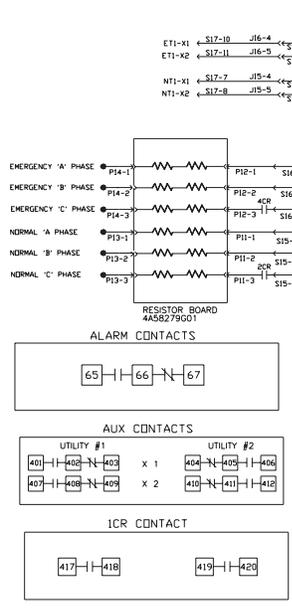
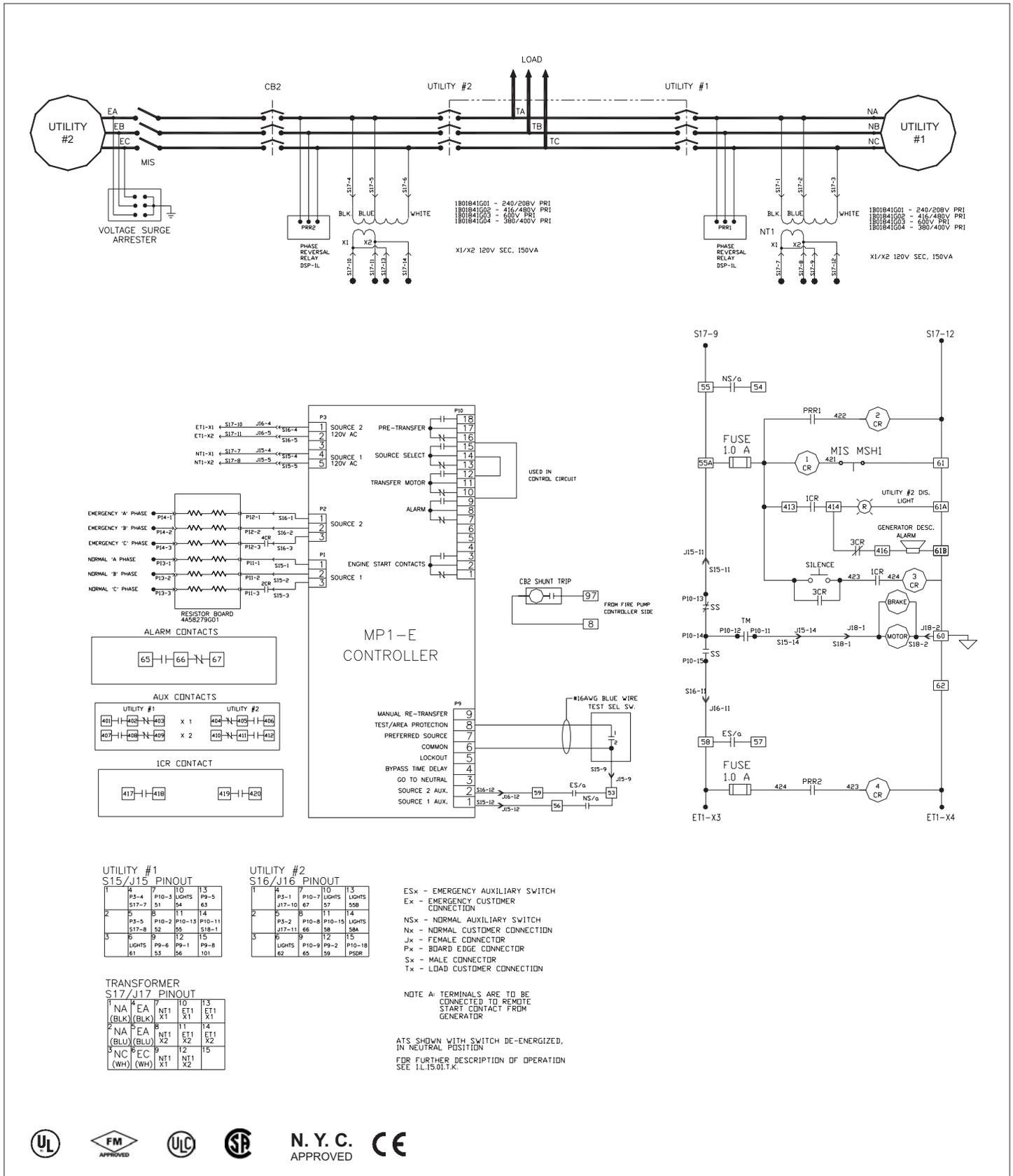


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Electrical Wiring Schematic

FT2U Automatic Power Transfer Switch c/w Second Utility



UTILITY #1  
S15/J15 PINOUT

1	4	7	10	13
P3-4	P10-3	LIGHTS	P9-5	ET1
S17-7	51	54	63	ET1
2	5	11	14	
P3-5	P10-2	P10-13	P10-11	
S17-8	52	55	S18-1	
3	6	12	15	
LIGHTS	P9-6	P9-1	P9-8	
61	53	56	101	

UTILITY #2  
S16/J16 PINOUT

1	4	7	10	13
P3-1	P10-7	LIGHTS	55B	LIGHTS
J17-10	67	57	74	
2	5	11	14	
P3-2	P10-8	P10-15	LIGHTS	
J17-11	66	58	S8A	
3	6	12	15	
LIGHTS	P10-9	P9-2	P10-18	
62	65	59	PSDR	

TRANSFORMER  
S17/J17 PINOUT

NA	EA	NT1	X1	10	13
(BLK)	(BLK)	(BLU)	(WH)	ET1	ET1
NA	EA	NT1	X2	11	14
(BLU)	(BLU)	(WH)	(WH)	ET1	ET1
NC	EC	NT1	X2	12	15
(WH)	(WH)	(WH)	(WH)	ET1	ET1

- ESx - EMERGENCY AUXILIARY SWITCH
- Ex - EMERGENCY CUSTOMER CONNECTION
- NSx - NORMAL AUXILIARY SWITCH
- Nx - NORMAL CUSTOMER CONNECTION
- Jx - FEMALE CONNECTOR
- Px - BOARD EDGE CONNECTOR
- Sx - MALE CONNECTOR
- Tx - LOAD CUSTOMER CONNECTION

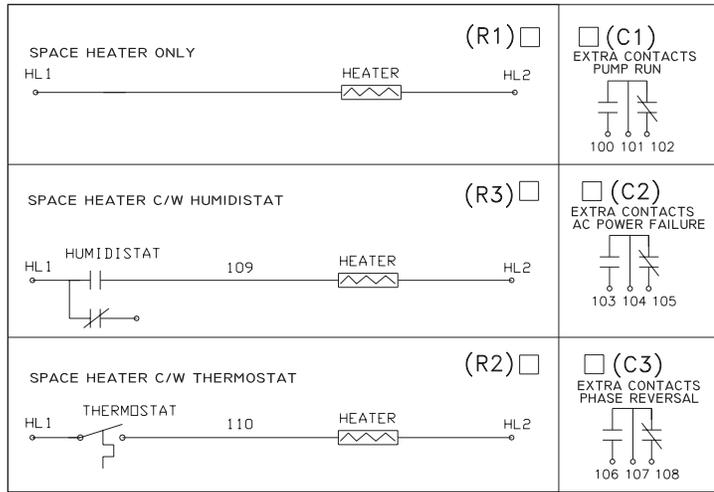
NOTE A: TERMINALS ARE TO BE CONNECTED TO REMOTE START CONTACT FROM GENERATOR

ATS SHOWN WITH SWITCH DE-ENERGIZED, IN NEUTRAL POSITION  
FOR FURTHER DESCRIPTION OF OPERATION SEE 1L15.01.TX.

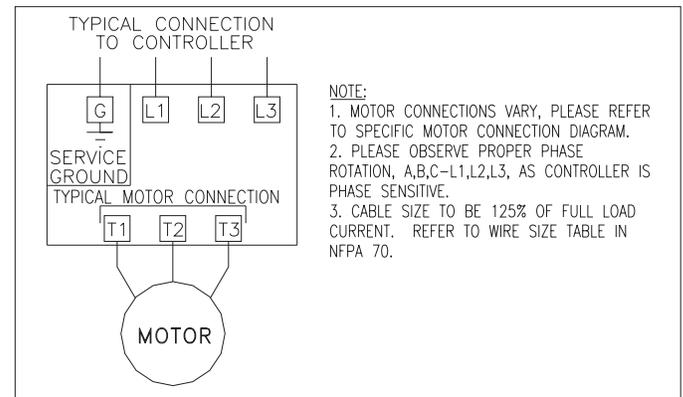


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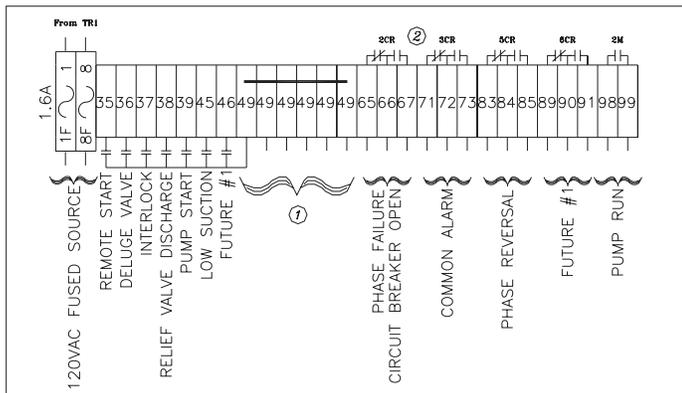
Options - Wiring Diagram



Typical Controller Connection

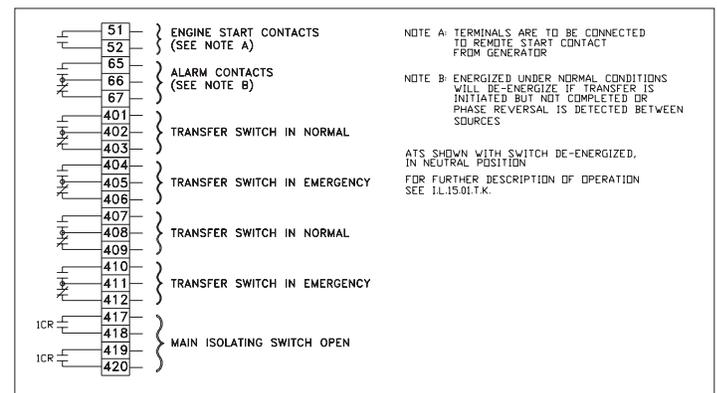


Main Terminal Block: TB1

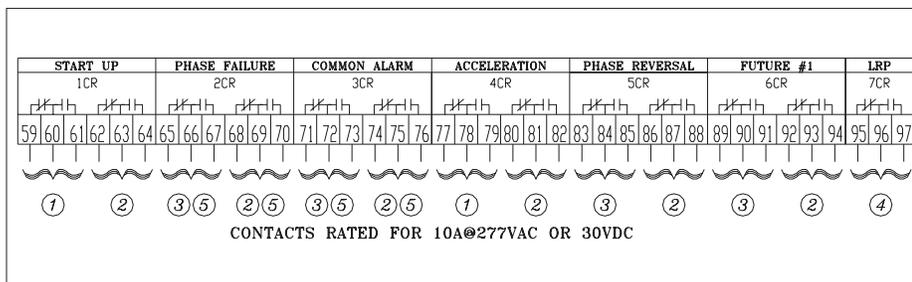


NOTES:  
 1. Terminal 49 is common to all dry contact inputs. DO NOT APPLY A VOLTAGE ON THESE TERMINALS  
 2. Contacts shown in de-energized state (Fail Safe).

Transfer Switch Terminal Block



Relay Card



NOTES:  
 1. To Control Circuit  
 2. Spare for Customer Connections  
 3. To TB1  
 4. To Shunt Trip  
 5. Contacts Shown in De-Energized State - (Fail Safe)