

FT70 Reduced Voltage - WYE DELTA (Star-Delta) OPEN



**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.

**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

**Product Features**

The FT70 Transfer Switch Controllers use a method of connecting the pump motor windings into wye configuration to start, then switching to a delta configuration to run. This reduces the starting current of the motor significantly. Wye-Delta starting is the only method that has a starting torque efficiency of 100%. The FT70 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**

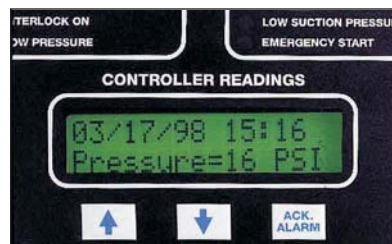
All LMR controllers come standard with NEMA 2 enclosures unless otherwise ordered. Available options include: NEMA 3R, 4, 4X, 12.

**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.

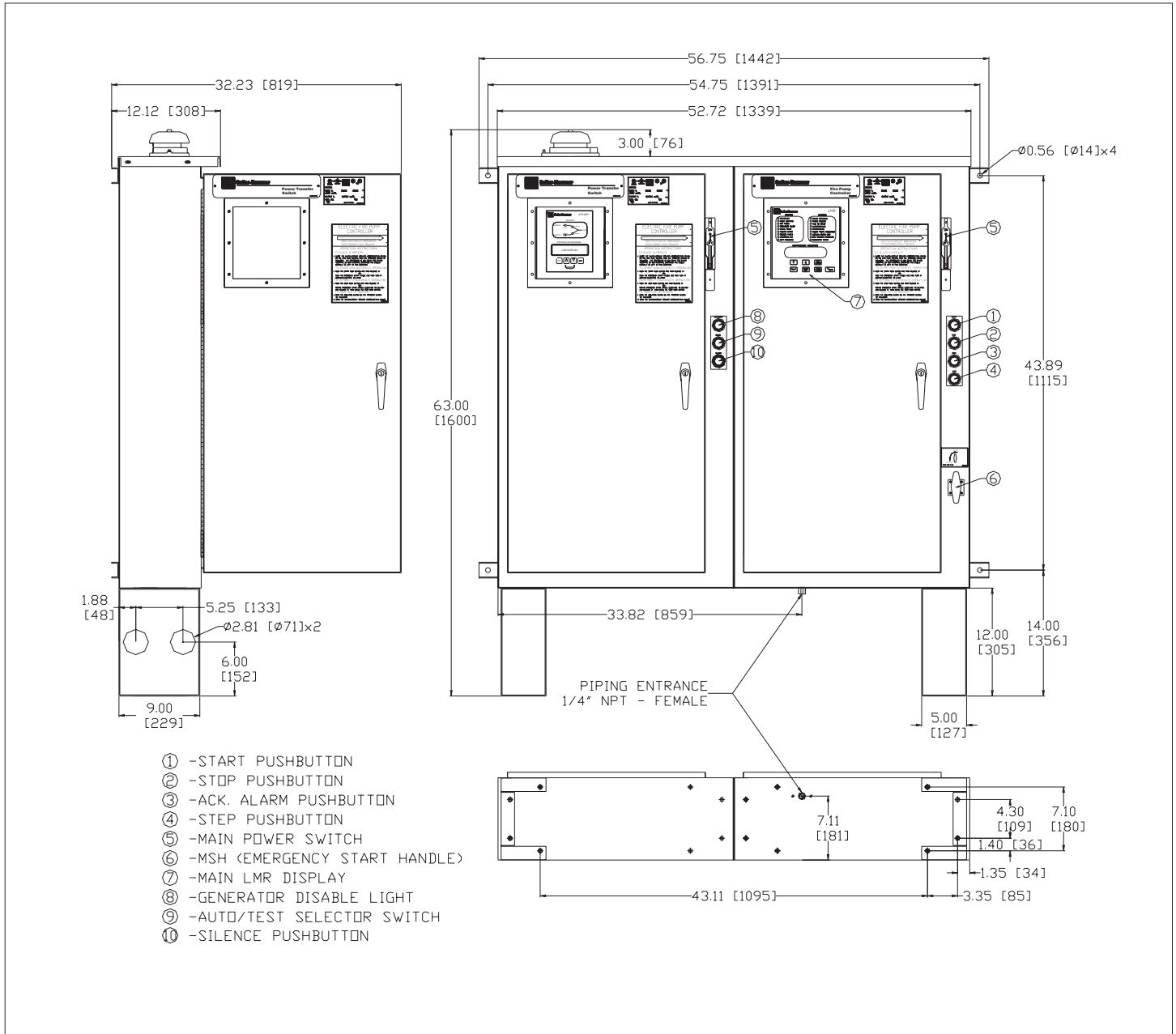


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Dimensions

FT70 WYE DELTA (Star-Delta) OPEN



Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)
		Standard	Intermediate	High	
5 - 40	200 - 208V	100,000	150,000	200,000	655 (297)
5 - 50	220 - 240V				
5 - 75	* 380 - 415V				
5 - 100	440 - 480V				
5 - 100	550 - 600V	25,000	100,000		

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

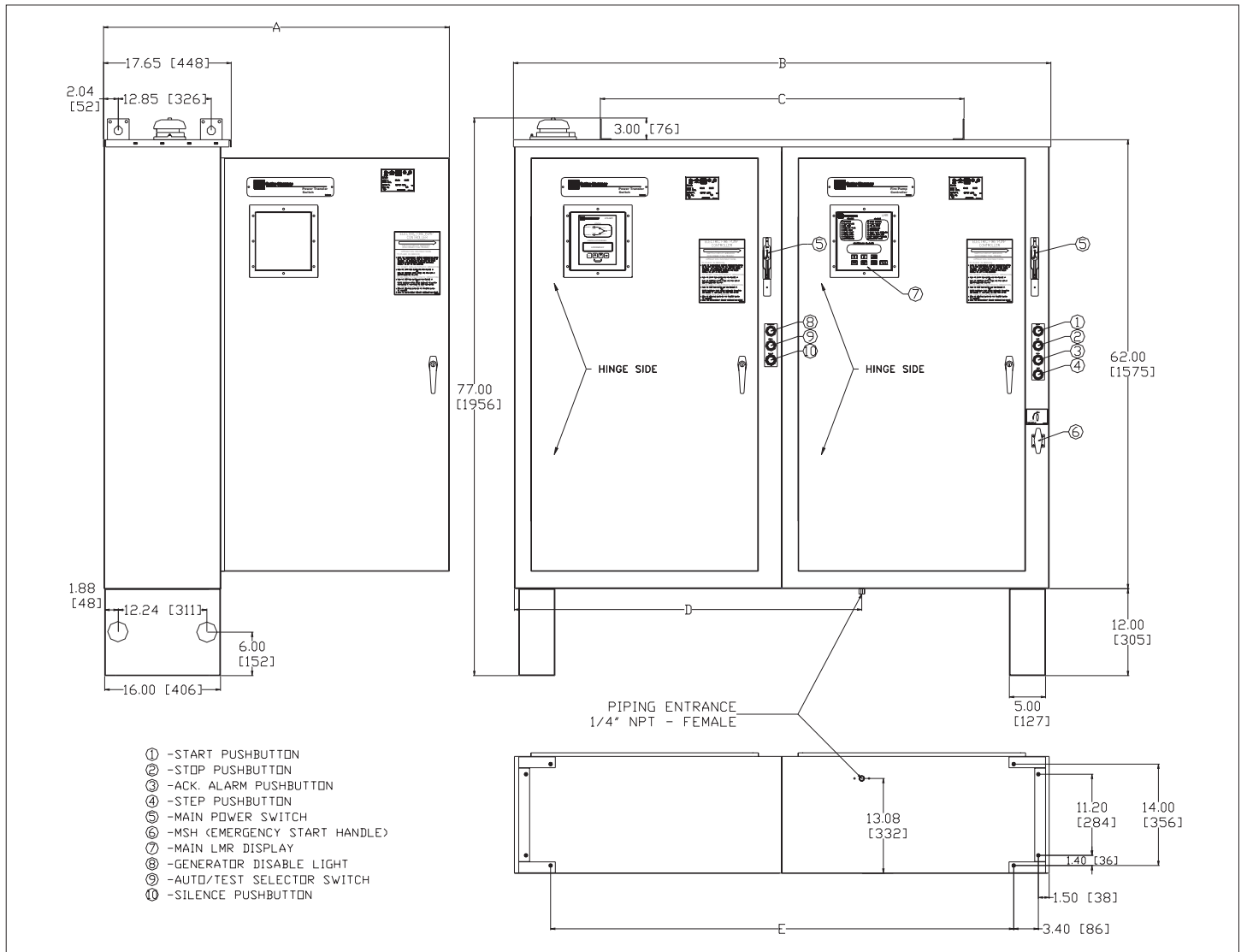


NOTES:  
 1. All enclosures finished in FirePump red.  
 2. Cable Entrance either top or bottom.  
 3. Standard Enclosure type NEMA 2.

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**Dimensions**

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Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)	A	B	C	D	E
		Standard	Intermediate	High						
50 - 100	200 - 208V	100,000	Consult Factory	Consult Factory	1030 (467)	47.79 (1214)	74.27 (1886)	50.27 (1277)	48.00 (1219)	64.00 (1626)
60 - 125	220 - 240V									
100 - 200	* 380 - 415V									
125 - 250	440 - 480V									
125 - 300	550 - 600V	25,000	35,000							
125 - 150	200 - 208V	100,000	Consult Factory		1135 (515)	53.79 (1366)	80.27 (2039)	56.27 (1429)	58.64 (1489)	70.00 (1778)
150 - 200	220 - 240V									
250 - 300	* 380 - 415V									
300 - 400	440 - 480V									
350 - 500	550 - 600V									

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

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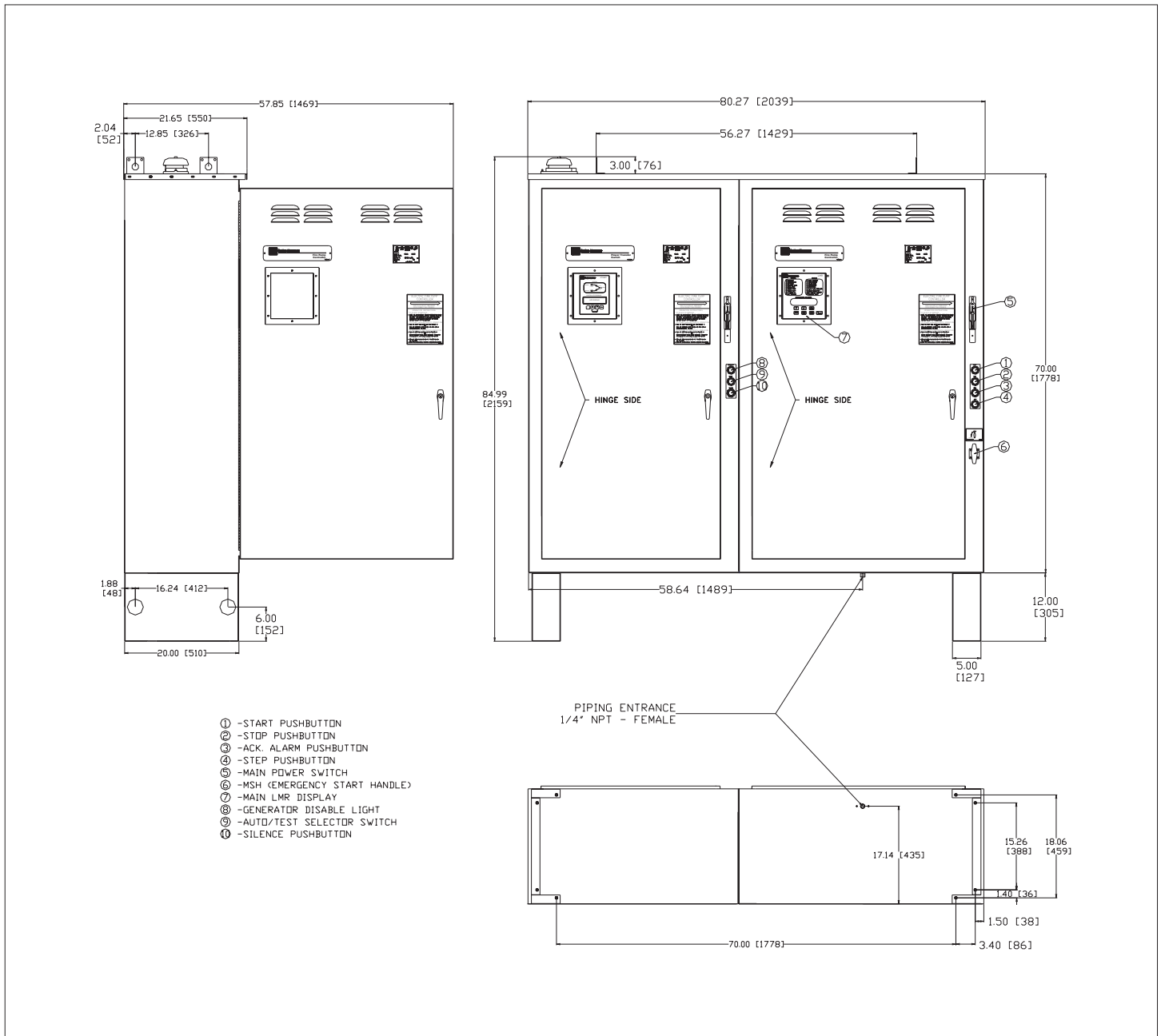


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Dimensions

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Motor Hp	Line Voltage	Withstand Rating			Approx. Weight Lbs. (Kg)
		Standard	Intermediate	High	
200 - 250	200 - 208V	100,000	Consult Factory	Consult Factory	1290 (585)
250 - 300	220 - 240V				
350 - 500	* 380 - 415V				
450 - 600	440 - 480V				
550 - 700	550 - 600V	25,000	35,000		

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

NOTES:

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2. Cable Entrance either top or bottom.
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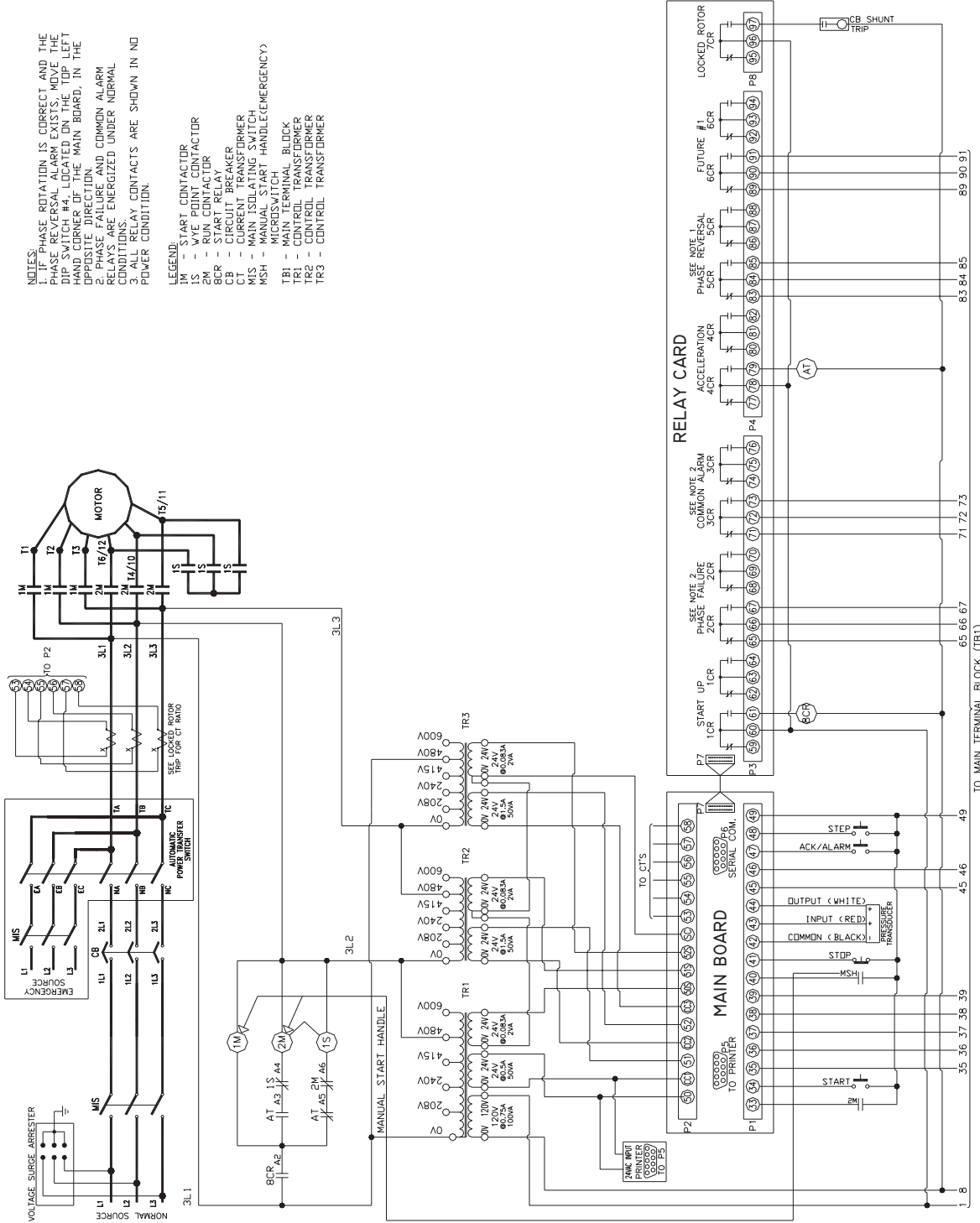


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Electrical Wiring Schematic  
FT70 WYE DELTA (Star-Delta) OPEN

NOTES:  
 1. IF PHASE ROTATION IS CORRECT AND THE MOTOR RUNS, THE MANUAL START SWITCH MUST BE KEPT OPEN TO PREVENT THE MOTOR FROM STARTING. THE MANUAL START SWITCH IS LOCATED ON THE TOP LEFT HAND CORNER OF THE MAIN BOARD, IN THE OPPOSITE DIRECTION.  
 2. PHASE FAILURE AND COMMON ALARM RELAYS ARE ENERGIZED UNDER NORMAL CONDITIONS. RELAY CONTACTS ARE SHOWN IN NO POWER CONDITION.

LEGEND:  
 1M - START CONTACTOR  
 1S - WYE POINT CONTACTOR  
 2M - RUN CONTACTOR  
 8CR - START RELAY  
 CB - CIRCUIT BREAKER  
 CIP - CIRCUIT BREAKER  
 MSH - MAIN ISOLATING SWITCH  
 MSH - MANUAL START SWITCH (EMERGENCY) MICROSWITCH  
 TBI - MAIN TERMINAL BLOCK  
 TR1 - CONTROL TRANSFORMER  
 TR2 - CONTROL TRANSFORMER  
 TR3 - CONTROL TRANSFORMER



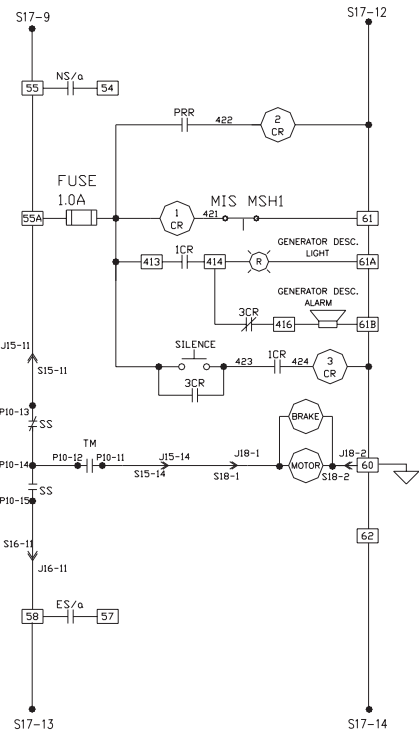
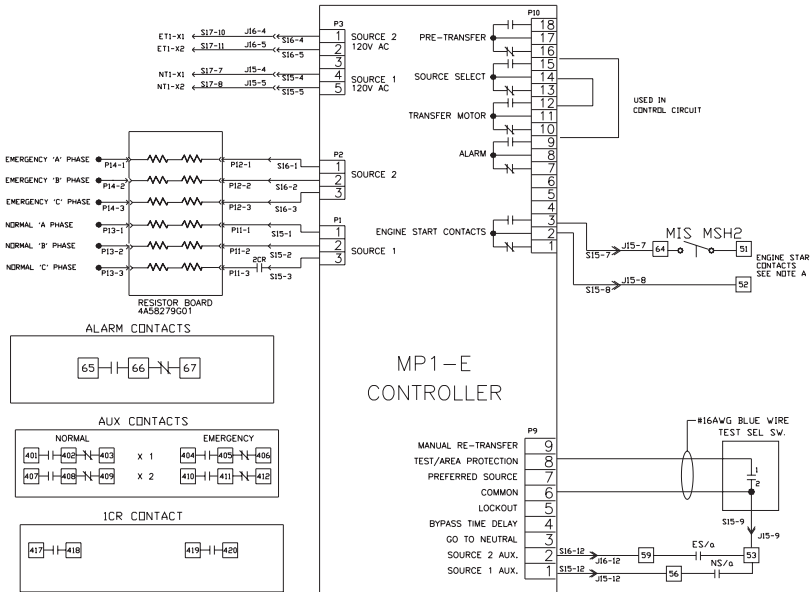
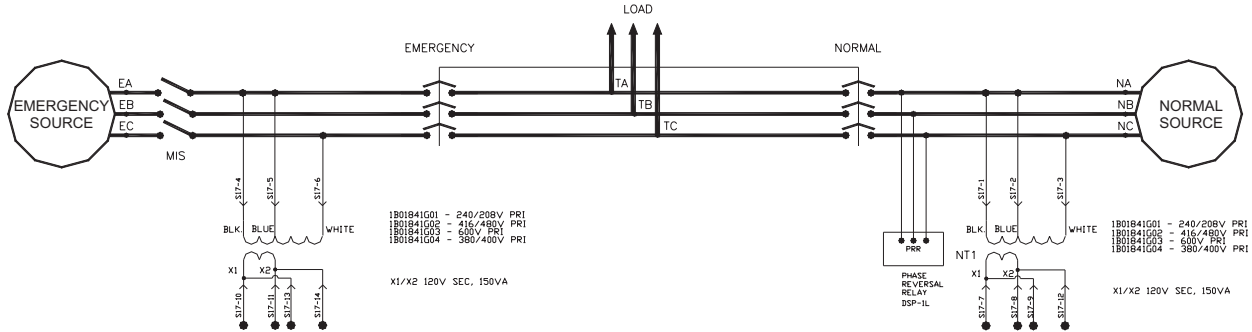
N. Y. C. APPROVED





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Electrical Wiring Schematic  
FT Automatic Power Transfer Switch



NORMAL  
S15/J15 PINOUT

1	4	7	10	13
NA	EA	NT1	ET1	P9-5
(BLK)	(BLK)	X1	X1	54
2	5	8	11	14
NT1	X1	S17-8	S18-10	63
X2	X3	X3	X3	M
3	6	9	12	15
NT1	X2	X2	X2	61
X4	X4	X4	X4	53
				NS/ø
				101

EMERGENCY  
S16/J16 PINOUT

1	4	7	10	13
EA	ET1	NT1	ET1	P9-5
AL	AL	AL	AL	57
2	5	8	11	14
EA	ET1	NT1	ET1	58
AL	AL	AL	AL	53
3	6	9	12	15
EA	ET1	NT1	ET1	62
AL	AL	AL	AL	54
				ES/ø
				PRE

TRANSFORMER  
S17/J17 PINOUT

1	4	7	10	13
NA	EA	NT1	ET1	X3
(BLK)	(BLK)	X1	X1	X3
2	5	8	11	14
NA	EA	NT1	ET1	X4
(BLU)	(BLU)	X2	X2	X4
3	6	9	12	15
NC	EC	NT1	ET1	X3
(WH)	(WH)	X3	X4	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

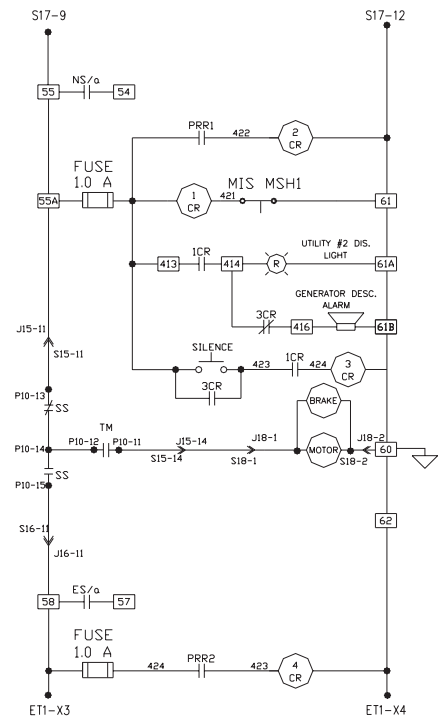
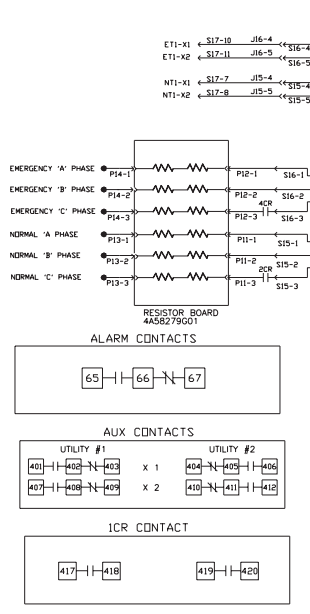
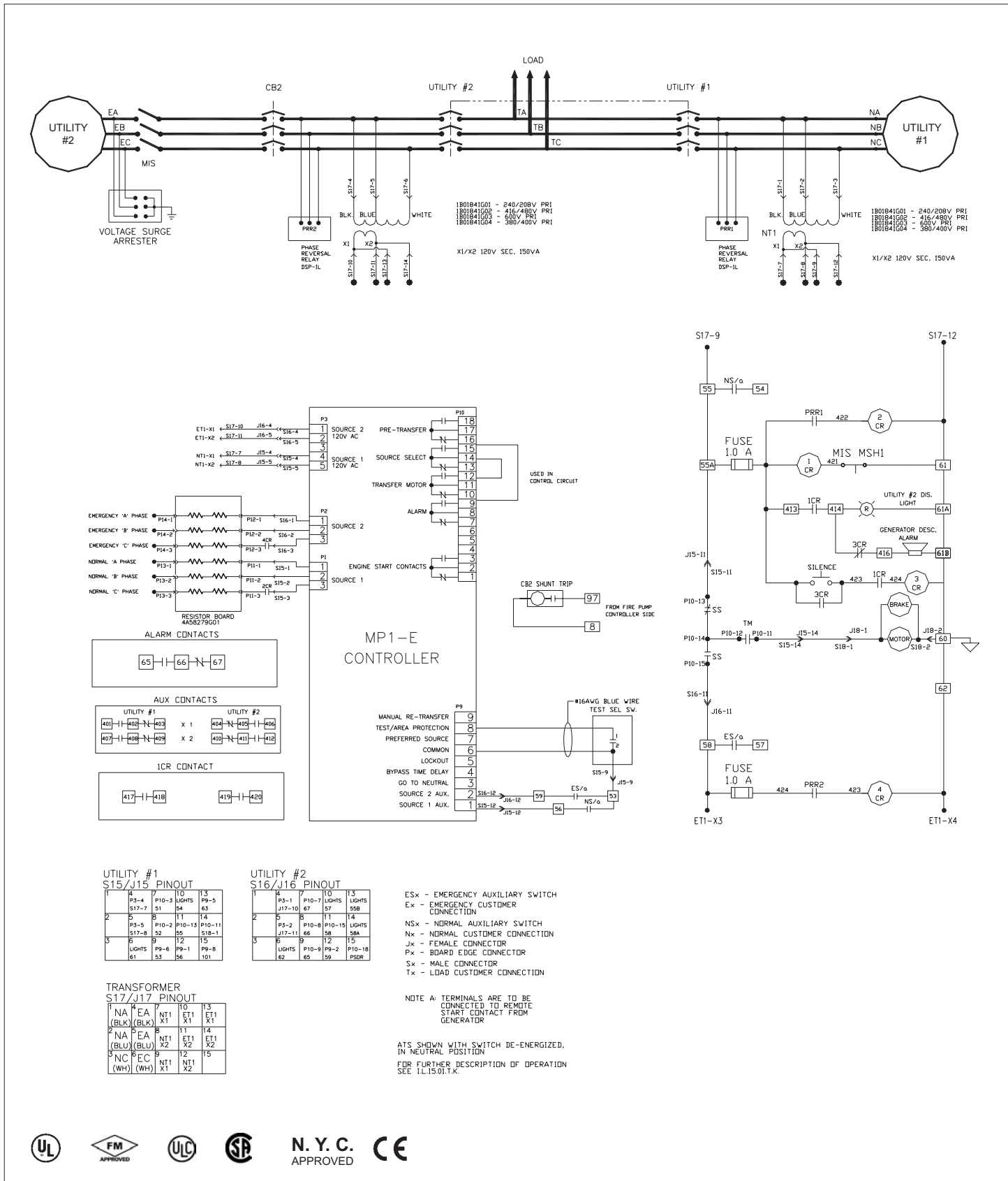
NOTE A: TERMINALS ARE TO BE CONNECTED TO REMOTE START CONTACT FROM GENERATOR

ATS SHOWN WITH SWITCH DE-ENERGIZED, IN NEUTRAL POSITION  
FOR FURTHER DESCRIPTION OF OPERATION SEE I.L.15.01.K.



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FT2U Automatic Power Transfer Switch c/w Second Utility



**UTILITY #1 S15/J15 PINOUT**

1	4	7	10	13
P3-4	P10-3	P10-5	P10-7	P10-9
S17-7	S17-8	S17-9	S17-10	S17-11
2	5	8	11	14
P3-5	P10-2	P10-13	P10-11	P10-11
S17-8	S17-8	S17-8	S17-8	S17-8
3	6	9	12	15
LIGHTS	P9-6	P9-1	P9-8	P9-8
61	53	56	101	

**UTILITY #2 S16/J16 PINOUT**

1	4	7	10	13
P3-1	P10-7	P10-7	P10-7	P10-7
S17-10	S17-10	S17-10	S17-10	S17-10
2	5	8	11	14
P3-2	P10-8	P10-15	P10-15	P10-15
S17-11	S17-11	S17-11	S17-11	S17-11
3	6	9	12	15
LIGHTS	P10-9	P9-2	P10-18	P10-18
62	65	59	PSDR	

**TRANSFORMER S17/J17 PINOUT**

1	4	7	10	13
NA (BLK)	EA (BLK)	NT1 (BLK)	ET1 (BLK)	ET1 (BLK)
2	5	8	11	14
NA (BLU)	EA (BLU)	NT1 (BLU)	ET1 (BLU)	ET1 (BLU)
3	6	9	12	15
NC (WH)	EC (WH)	NT1 (WH)	ET1 (WH)	ET1 (WH)

- 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.

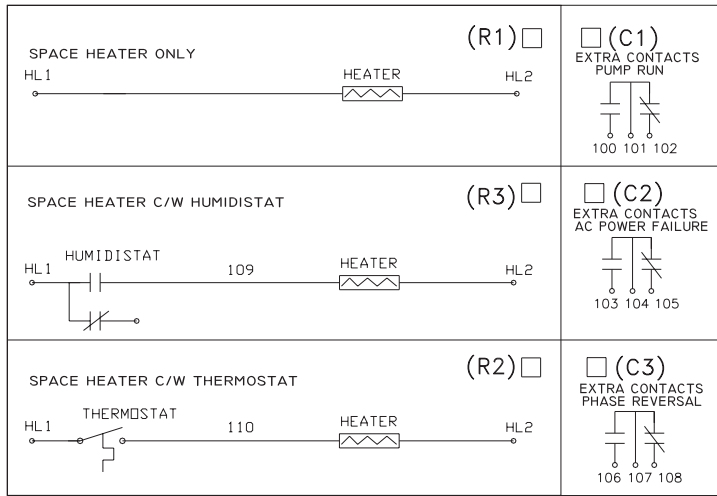




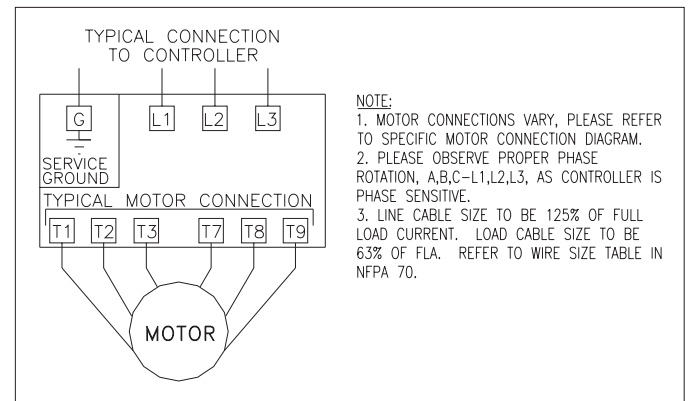
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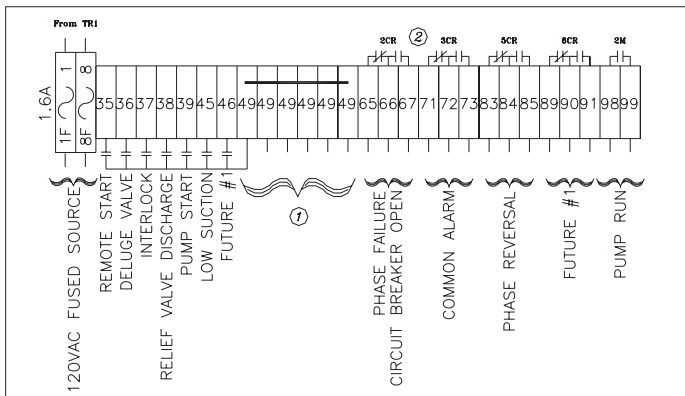
**Options - Wiring Diagram**



**Typical Controller Connection**

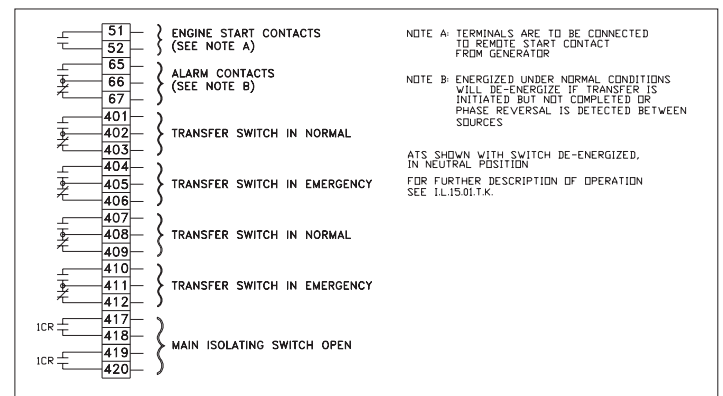


**Main Terminal Block: TB1**

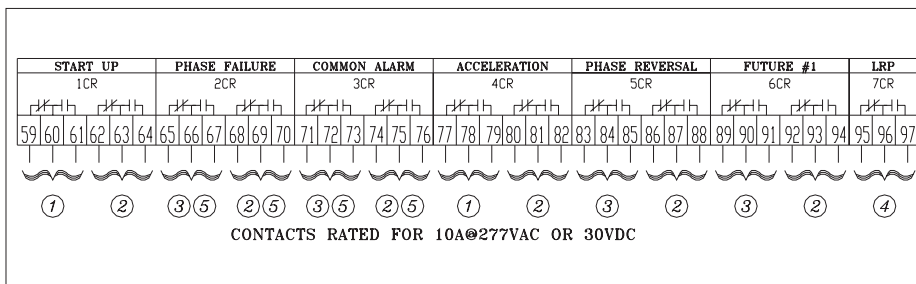


NOTES:  
1. Terminal 49 is common to all dry contact inputs. DO NOT APPLY A VOLTAGE ON THESE TERMINALS.  
2. Contacts shown in de-energized state (Fail Safe).

**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)