

January 2005

## FTC Series - Compact



## 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.

## Transfer Switch Features

## Test Switch

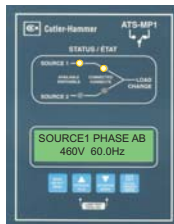
A test switch is provided on the outside of the controller that can be used to simulate the loss of power on the normal source. As well, a silence pushbutton is provided which de-energizes the alarm bell.

## 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.

## 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 |

## 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 &amp; 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

## Product Features

Designed to reduce the overall height of package installations, this 40 inch by 12 inch deep controller allows installations in pump rooms that have restricted access and ceiling height.

Available models include FTC20 Limited Service, FTC30 Across-the-Line and FTC60 Autotransformer models. All FTC 20 Limited Service controllers are available with or without LMR microprocessor control while FTC30 and FTC60 controller are equipped with LMR microprocessor control as standard.

Note: FTC20 without LMR option - will be supplied as a standard FT20 Limited Service controller.

## 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.

## 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 energizes whenever there are any alarm conditions present. This relay is de-energized under normal conditions and has LED status indication on the main relay board.

### 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".



### 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.

### 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.

### NEMA 2 Enclosures

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

## Status & Alarm Indication



### Alarm & 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.

## Standards & 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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## Technical Data and Specifications

## Line Terminals (Incoming Cables) - FTC20 Limited Service

|         | Line Terminals on Main Isolation Switch (Incoming Cables) |           |             |           |           |                          |  |
|---------|---|-----------|-------------|-----------|-----------|--------------------------|--|
|         | LINE VOLTAGE  |           |             |           |           | Qty. & Cable Sizes       | Service Entrance GND.LUG<br>Qty. & Cable Sizes |
|         | 200 - 208   | 220 - 240 | * 380 - 415 | 440 - 480 | 550 - 600 |                          |  |
| Max. Hp | 30  | 30        | 30          | 30        | 30        | (1)#14-1/0 PER ø (CU/AL) | (1)#14-3/0 (CU/AL)                             |

## Line Terminals (Incoming Cables) - FTC30 Across-the-Line, FTC60 Autotransformer

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

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

## Load Terminals (To Motor) - FTC20 Limited Service

|         | Load Terminals (To Motor) |           |           |           |           | Qty. & Cable Sizes                   |
|---------|---------------------------|-----------|-----------|-----------|-----------|--------------------------------------|
|         | LINE VOLTAGE              |           |           |           |           |                                      |
|         | 200 - 208                 | 220 - 240 | 380 - 415 | 440 - 480 | 550 - 600 |                                      |
| Max. Hp | 10                        | 15        | 25        | 25        | 25        | (1)#14-#3 PER $\varnothing$ (CU/AL)  |
|         | 25                        | 30        | 30        | 30        | 30        | (1)#14-1/0 PER $\varnothing$ (CU/AL) |
|         | 30                        |           |           |           |           | (1)#6-250MCM $\varnothing$ (CU/AL)   |

## Load Terminals (To Motor) - FTC30 Across-the-Line, FTC60 Autotransformer

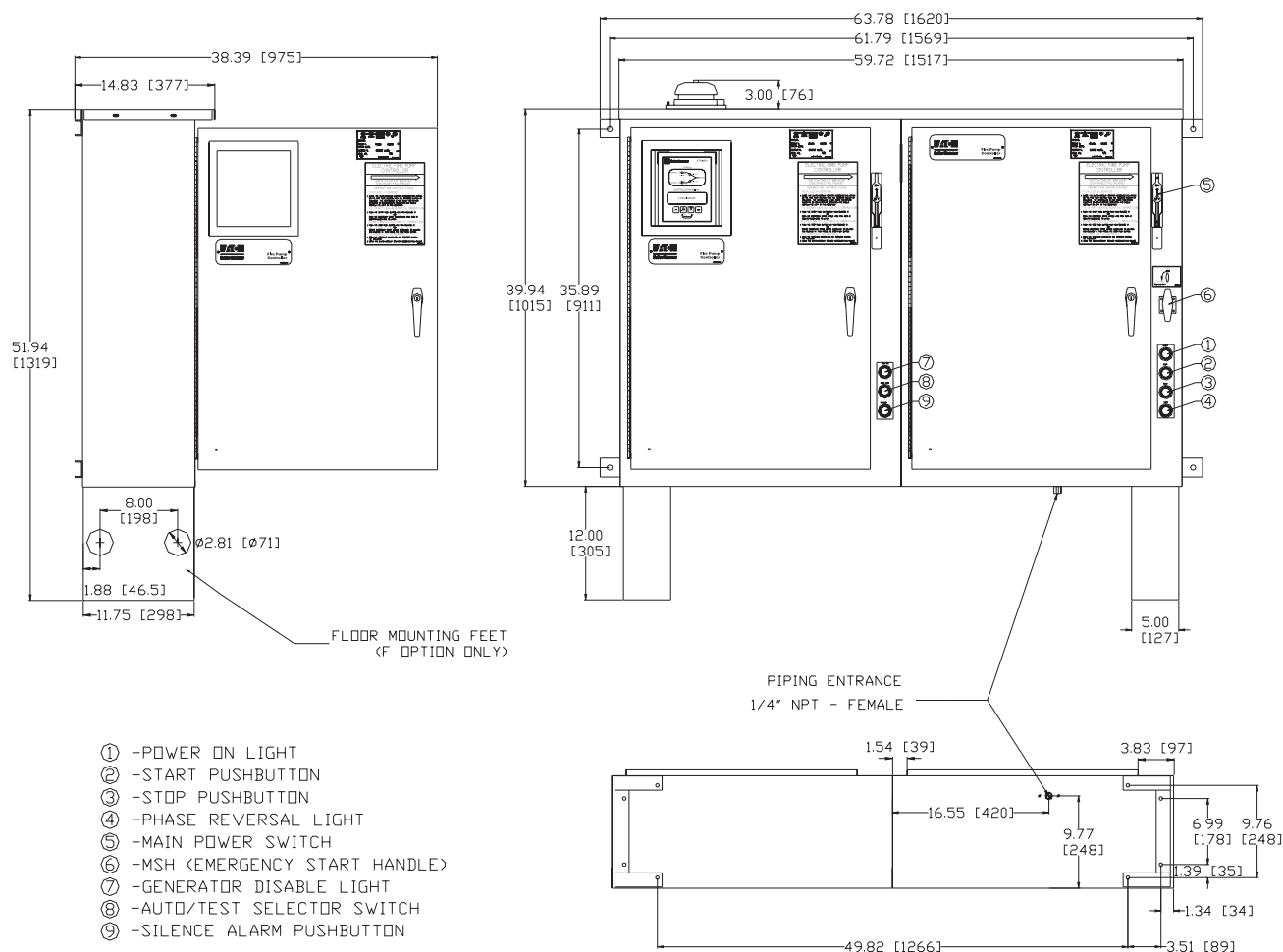
|         | Load Terminals (To Motor) |           |           |           |           |                          |
|---------|---------------------------|-----------|-----------|-----------|-----------|--------------------------|
|         | LINE VOLTAGE              |           |           |           |           | Qty. & Cable Sizes       |
|         | 200 - 208                 | 220 - 240 | 380 - 415 | 440 - 480 | 550 - 600 |                          |
| Max. Hp | 10                        | 15        | 25        | 25        | 25        | (1)#14-#3 PER ø (CU/AL)  |
|         | 25                        | 30        | 50        | 50        | 50        | (1)#14-1/0 PER ø (CU/AL) |
|         | 40                        | 50        | 75        | 100       | 100       | (1)#6-250MCM ø (CU/AL)   |

For Proper Cable Size Refer to National Electrical Code NFPA-70

## FTC Series - Compact

## Dimensions

## FTC20 Limited Service



| Motor Hp | Line Voltage | Withstand Rating |              | Approx. Weight<br>Lbs. (Kg) |
|----------|--------------|------------------|--------------|-----------------------------|
|          |              | Standard         | Intermediate |                             |
| 5 - 30   | 200 - 208V   | 25,000           | 65,000       | 555<br>(252)                |
| 5 - 30   | 220 - 240V   |                  |              |                             |
| 5 - 30   | * 380 - 415V |                  |              |                             |
| 5 - 30   | 440 - 480V   |                  |              |                             |
| 5 - 30   | 550 - 600V   | 18,000           | 25,000       |                             |
| 5 - 15   | 230V - S/P   | 10,000           | 65,000       |                             |

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

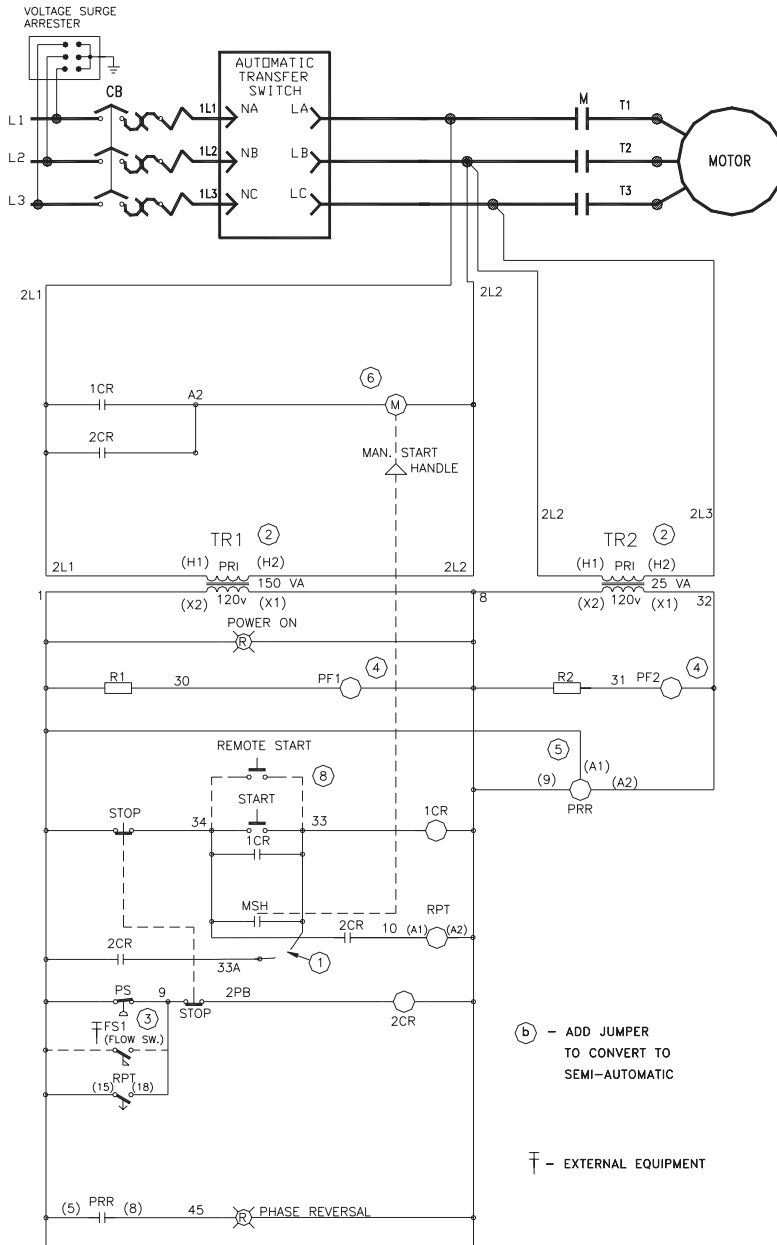


## NOTES:

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

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## FTC Series - Compact

Electrical Wiring Schematic  
FTC20 Limited Service

## LEGEND:

M-RUN CONTACTOR  
 1CR-MANUAL CONTROL RELAY  
 2CR-AUTO CONTROL RELAY  
 TR1-CONTROL TRANSFORMER  
 TR2-CONTROL TRANSFORMER  
 PS-PRESSURE SWITCH  
 PRR-PHASE REVERSAL RELAY  
 PF2-PHASE FAILURE RELAY  
 PF1-PHASE FAILURE RELAY  
 R1-PHASE FAILURE RESISTOR  
 R2-PHASE FAILURE RESISTOR  
 CB-CIRCUIT BREAKER  
 STOP-LOCAL STOP SWITCH  
 START-LOCAL START SWITCH  
 FU-CONTROL FUSES  
 MSH-MANUAL START HANDLE (AUX. CONTACT)  
 FS1-FLOW SWITCH PROVISION  
 RPT-RUN PERIOD TIMER

## NOTES:

1. ADD JUMPER TO CONVERT TO SEMI-AUTOMATIC.
2. FOR 416V PRIMARY VOLTAGE REFER TO TRANSFORMER CONNECTION DRAWING.(FCFD201)
3. FOR CONNECTION OF CUSTOMER SUPPLIED FLOW SWITCH.
4. FOR PF1 & PF2 ALARM CONTACTS SEE FIELD CONNECTION DIAGRAM.(FCFD201)
5. FOR PRR ALARM CONTACTS SEE FIELD CONNECTION DIAGRAM.(FCFD201)
6. FOR OPERATING ALARM CONTACTS SEE FIELD CONNECTION DIAGRAM.(FCFD201)
7. ALL RELAY CONTACTS SHOWN IN NO POWER CONDITION.
8. FOR CUSTOMER REMOTE START SEE FIELD CONNECTION DIAGRAM.(FCFD201)
9. SERVICE ENTRANCE EQUIPMENT. (DOES NOT MEET CSA SERVICE ENTRANCE REQUIREMENTS)

(b) - ADD JUMPER TO CONVERT TO SEMI-AUTOMATIC

† - EXTERNAL EQUIPMENT



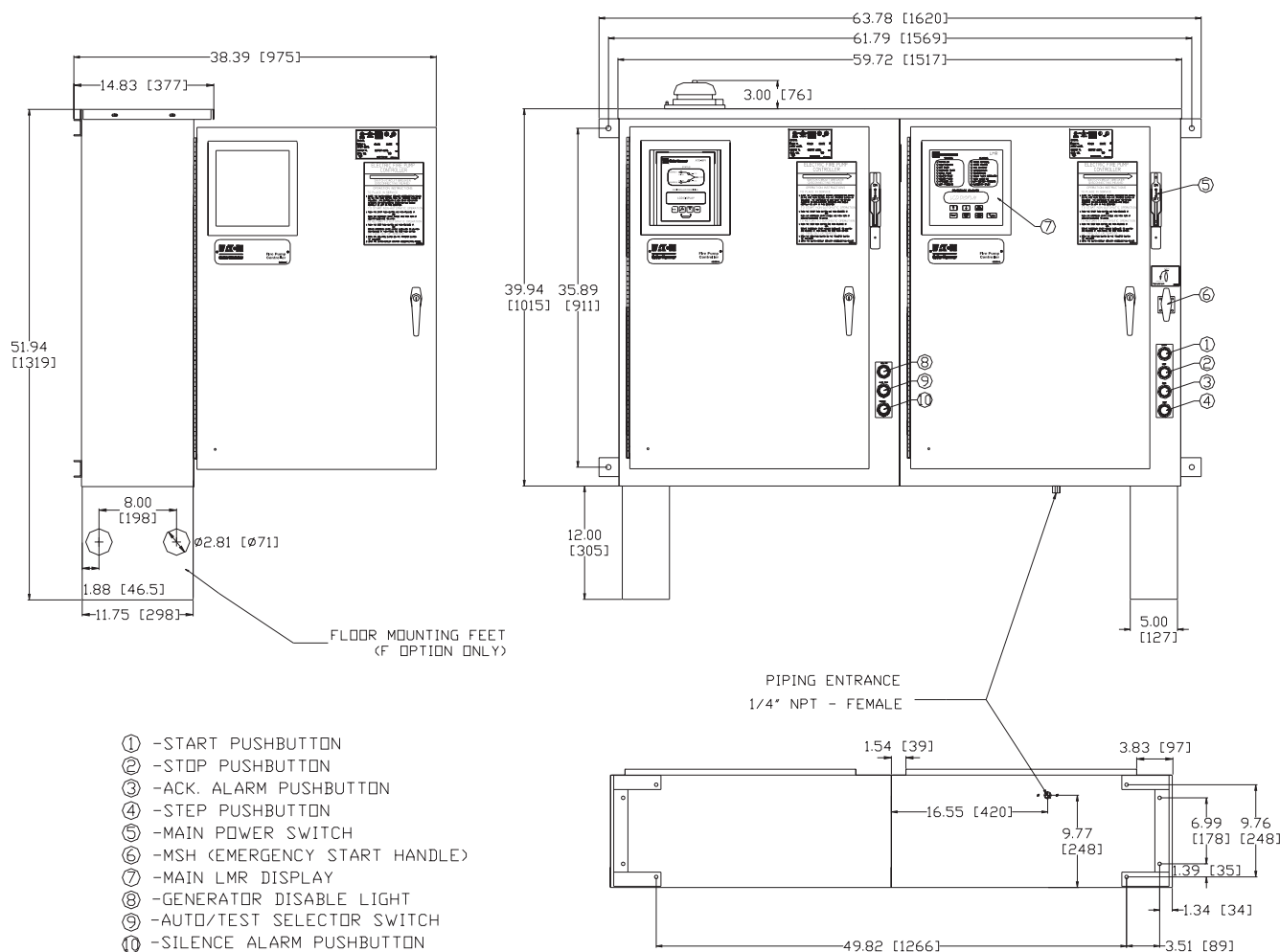
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## FTC Series - Compact

## Dimensions

## FTC20 Limited Service with LMR Option



| Motor Hp | Line Voltage | Withstand Rating |              | Approx. Weight<br>Lbs. (Kg) |
|----------|--------------|------------------|--------------|-----------------------------|
|          |              | Standard         | Intermediate |                             |
| 5 - 30   | 200 - 208V   | 25,000           | 65,000       | 555<br>(252)                |
| 5 - 30   | 220 - 240V   |                  |              |                             |
| 5 - 30   | * 380 - 415V |                  |              |                             |
| 5 - 30   | 440 - 480V   |                  |              |                             |
| 5 - 30   | 550 - 600V   | 18,000           | 25,000       |                             |
| 5 - 15   | 230V - S/P   | 10,000           | 65,000       |                             |

\* 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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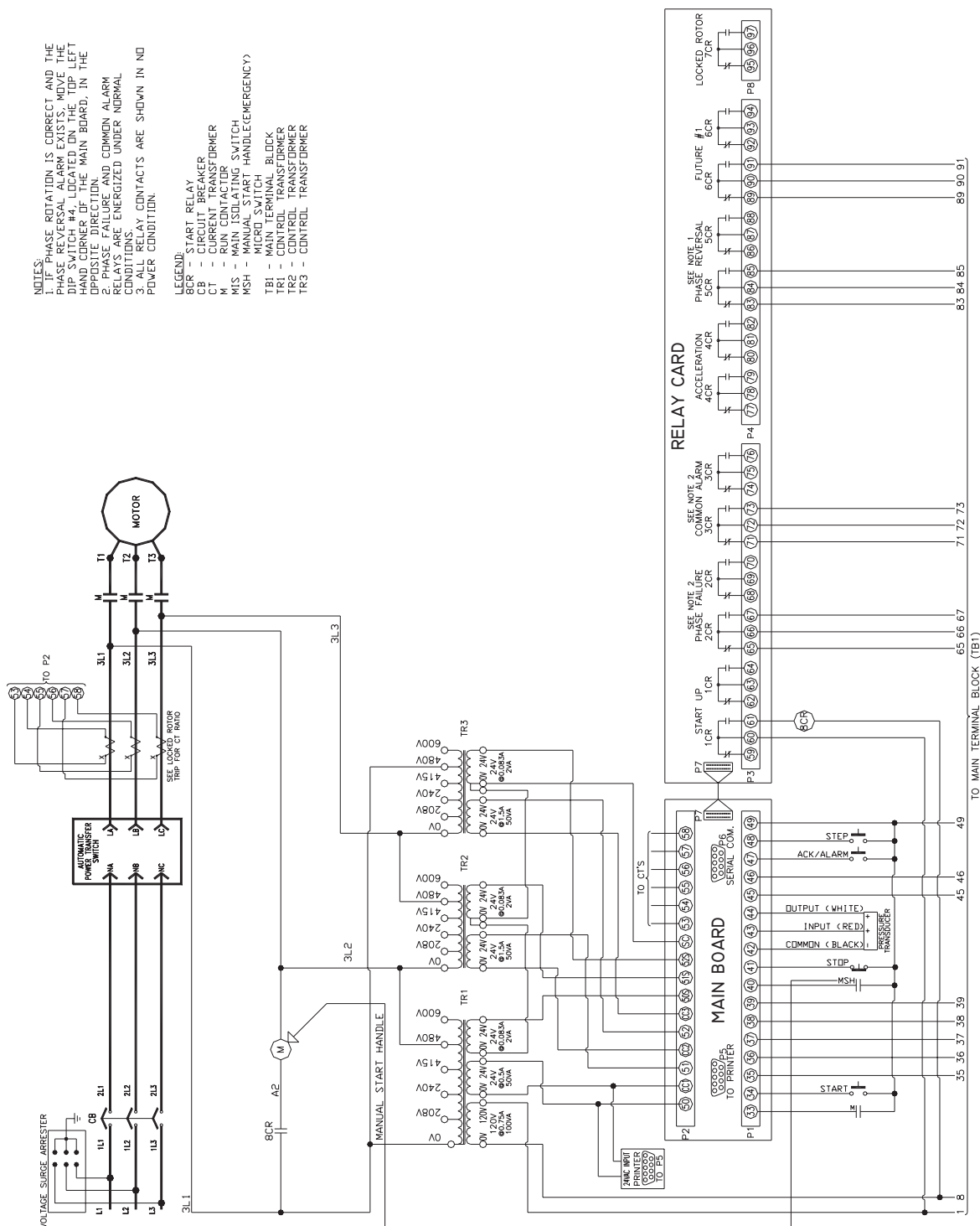


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## FTC Series - Compact

## Electrical Wiring Schematic

### FTC20 Limited Service with LMR Option



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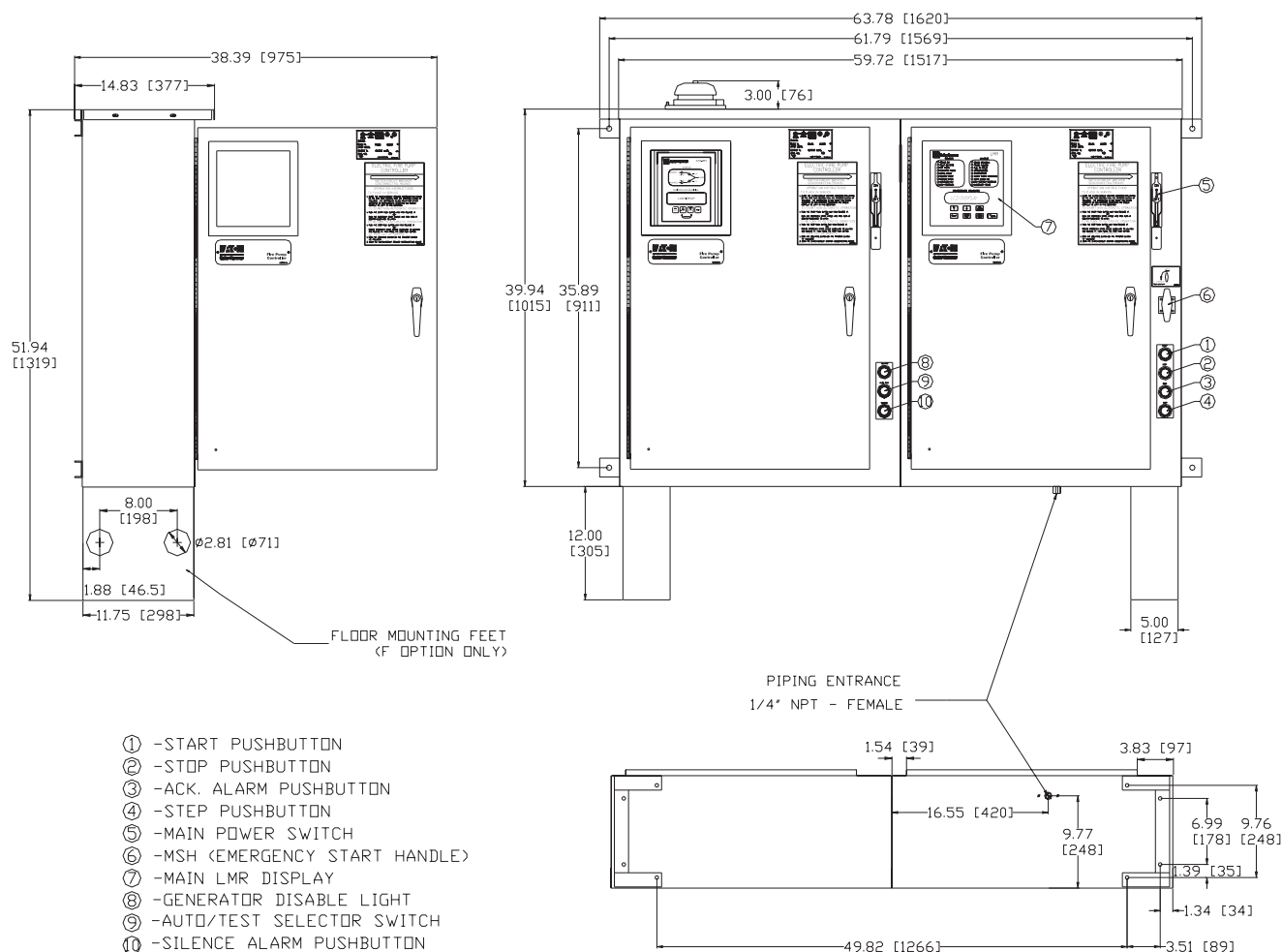




## FTC Series - Compact

## Dimensions

## FTC30 Across-the-Line



| Motor Hp | Line Voltage | Withstand Rating |              |         | Approx. Weight<br>Lbs. (Kg) |
|----------|--------------|------------------|--------------|---------|-----------------------------|
|          |              | Standard         | Intermediate | High    |                             |
| 5 - 40   | 200 - 208V   | 100,000          | 150,000      | 200,000 | 610<br>(277)                |
| 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.



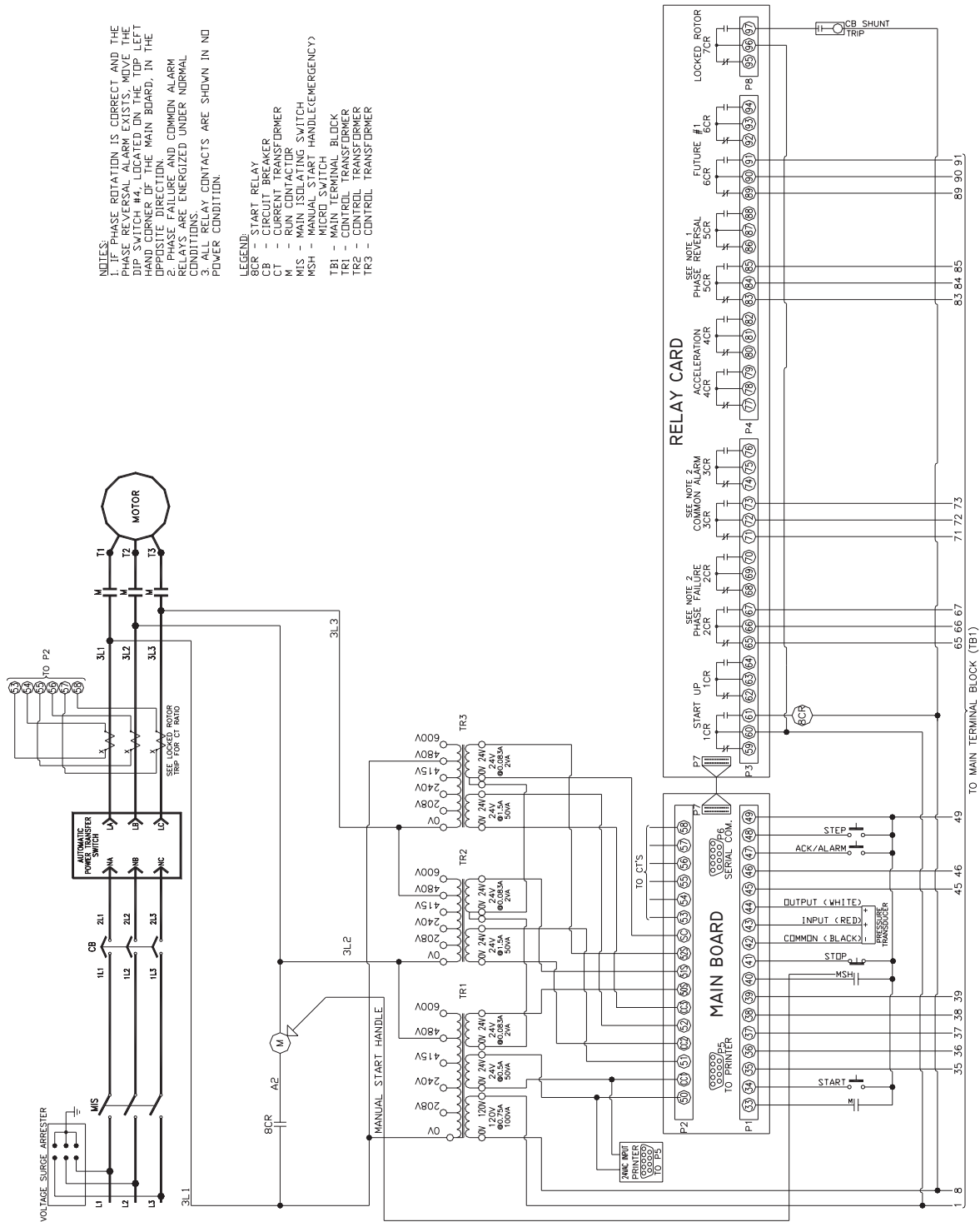
## NOTES:

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



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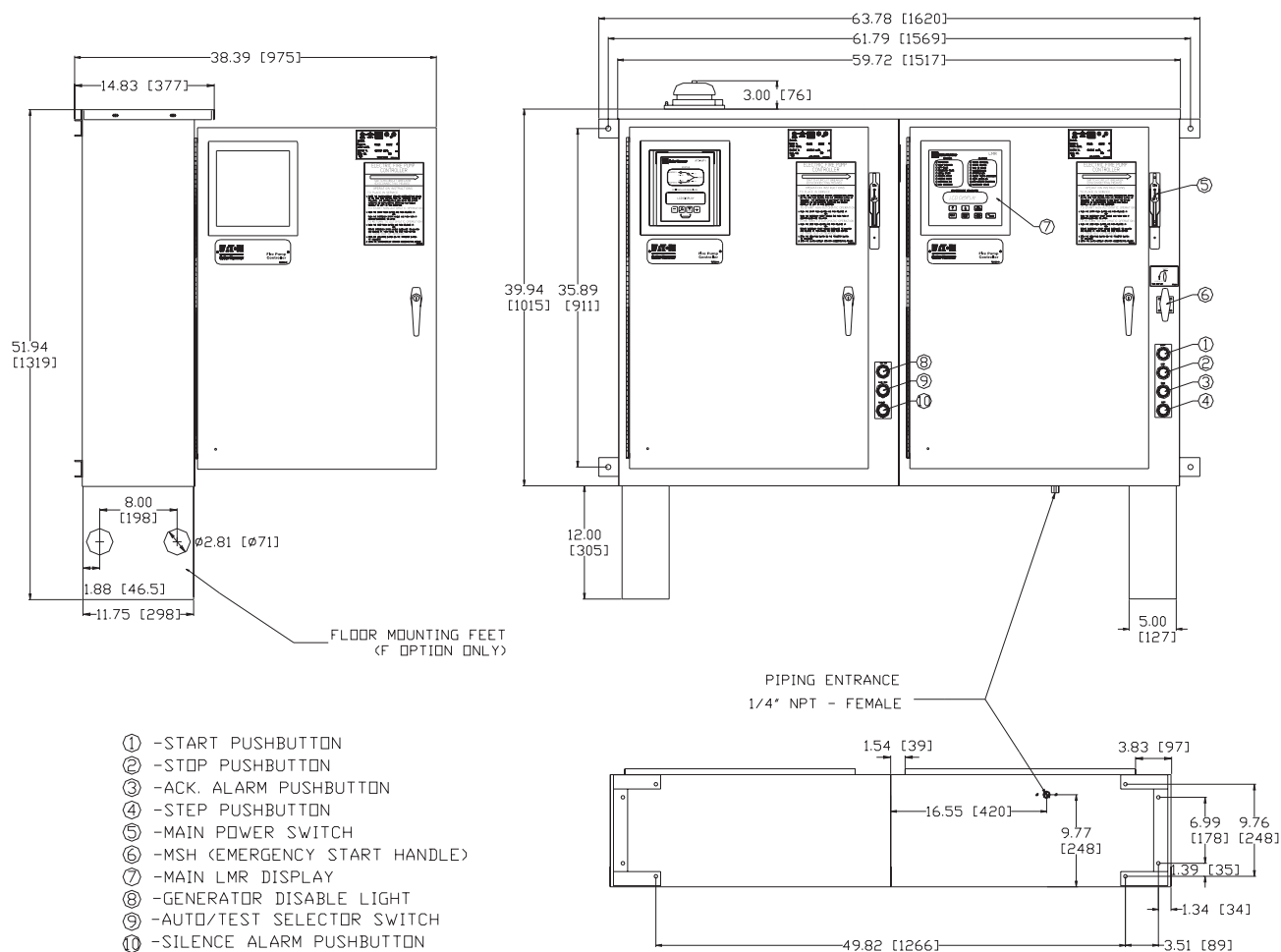
## FTC Series - Compact

Electrical Wiring Schematic  
FTC30 Across-the-LineN. Y. C.  
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## FTC Series - Compact

## Dimensions

## FTC60 Autotransformer



| Motor Hp | Line Voltage | Withstand Rating |              |         | Approx. Weight<br>Lbs. (Kg) |
|----------|--------------|------------------|--------------|---------|-----------------------------|
|          |              | Standard         | Intermediate | High    |                             |
| 5 - 40   | 200 - 208V   | 100,000          | 150,000      | 200,000 | 610<br>(277)                |
| 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.



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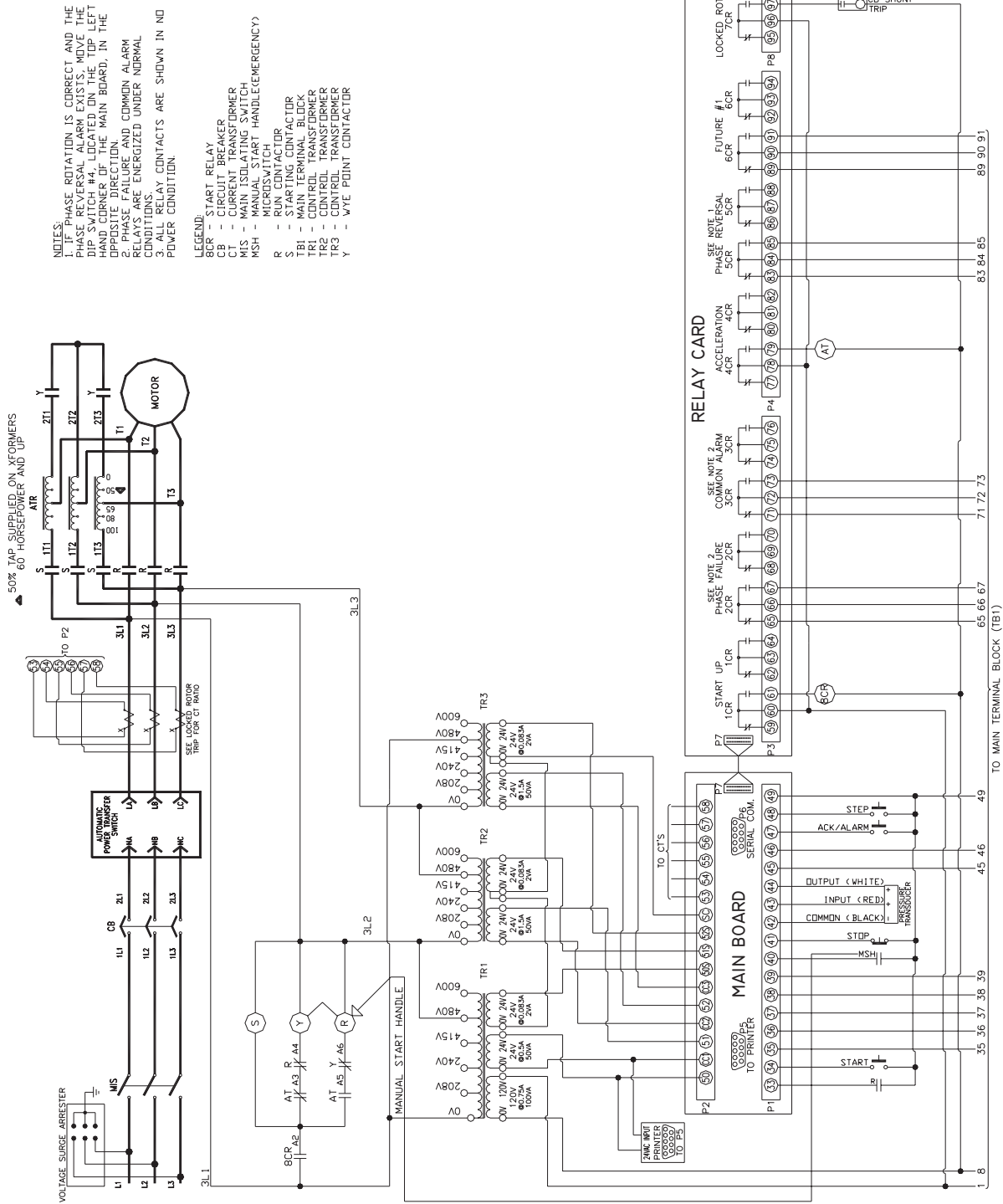


## NOTES:

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

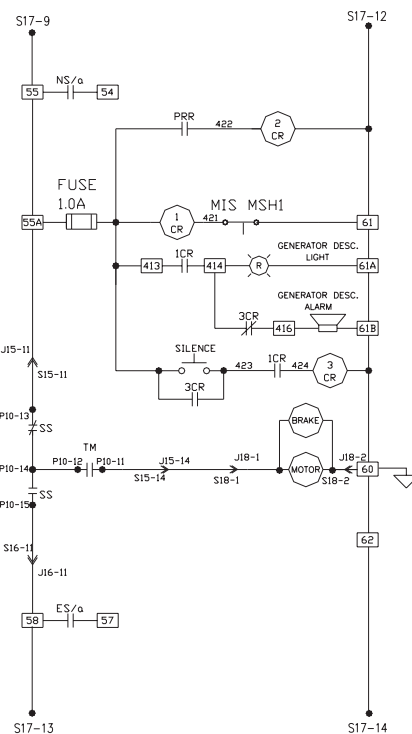
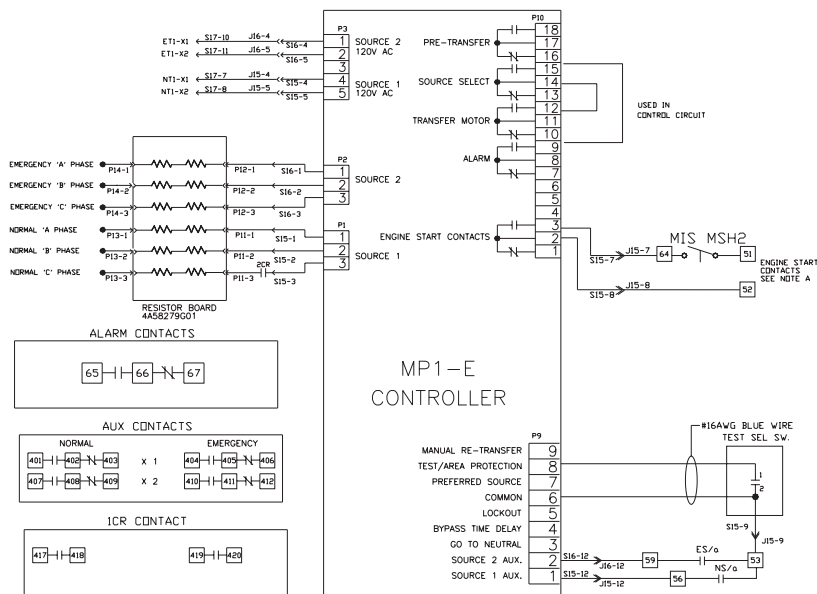
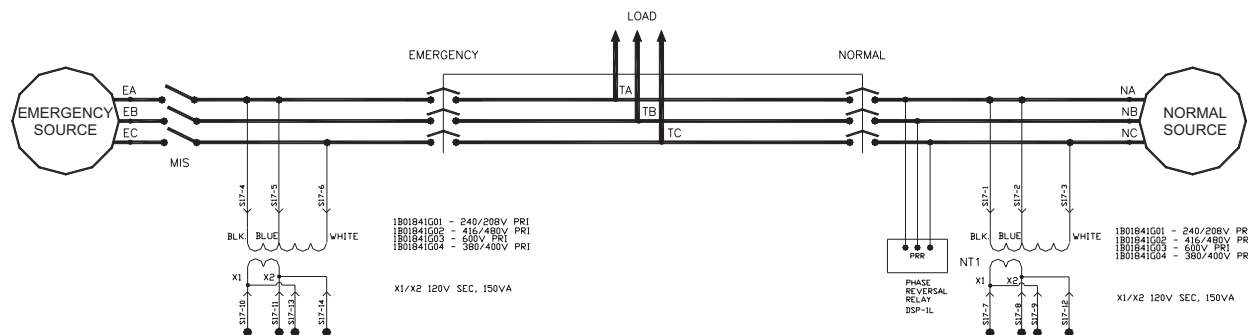
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## FTC Series - Compact

Electrical Wiring Schematic  
FTC60 Autotransformer

FTC Series - Compact

# Electrical Wiring Schematic FT Automatic Power Transfer Switch



## NORMAL S15/J15 PINOUT

|    |    |     |     |     |     |     |     |     |     |     |
|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 4  | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| NA | EA | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 |
| 2  | NA | EA  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  |
| 3  | NC | EC  | NT1 | X3  | NT1 | X3  | NT1 | X3  | NT1 | X3  |

## EMERGENCY S16/J16 PINOUT

|    |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| EA | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  |
| 2  | EA  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 |
| 3  | EC  | NT1 | X3  | NT1 | X3  | NT1 | X3  | NT1 | X3  | NT1 |

## TRANSFORMER S17/J17 PINOUT

|    |    |     |     |     |     |     |     |     |     |     |
|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | 4  | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| NA | EA | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 |
| 2  | NA | EA  | NT1 | X1  | NT1 | X1  | NT1 | X1  | NT1 | X1  |
| 3  | NC | EC  | NT1 | X3  | NT1 | X3  | NT1 | X3  | NT1 | X3  |

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.T.K.



N. Y. C. APPROVED

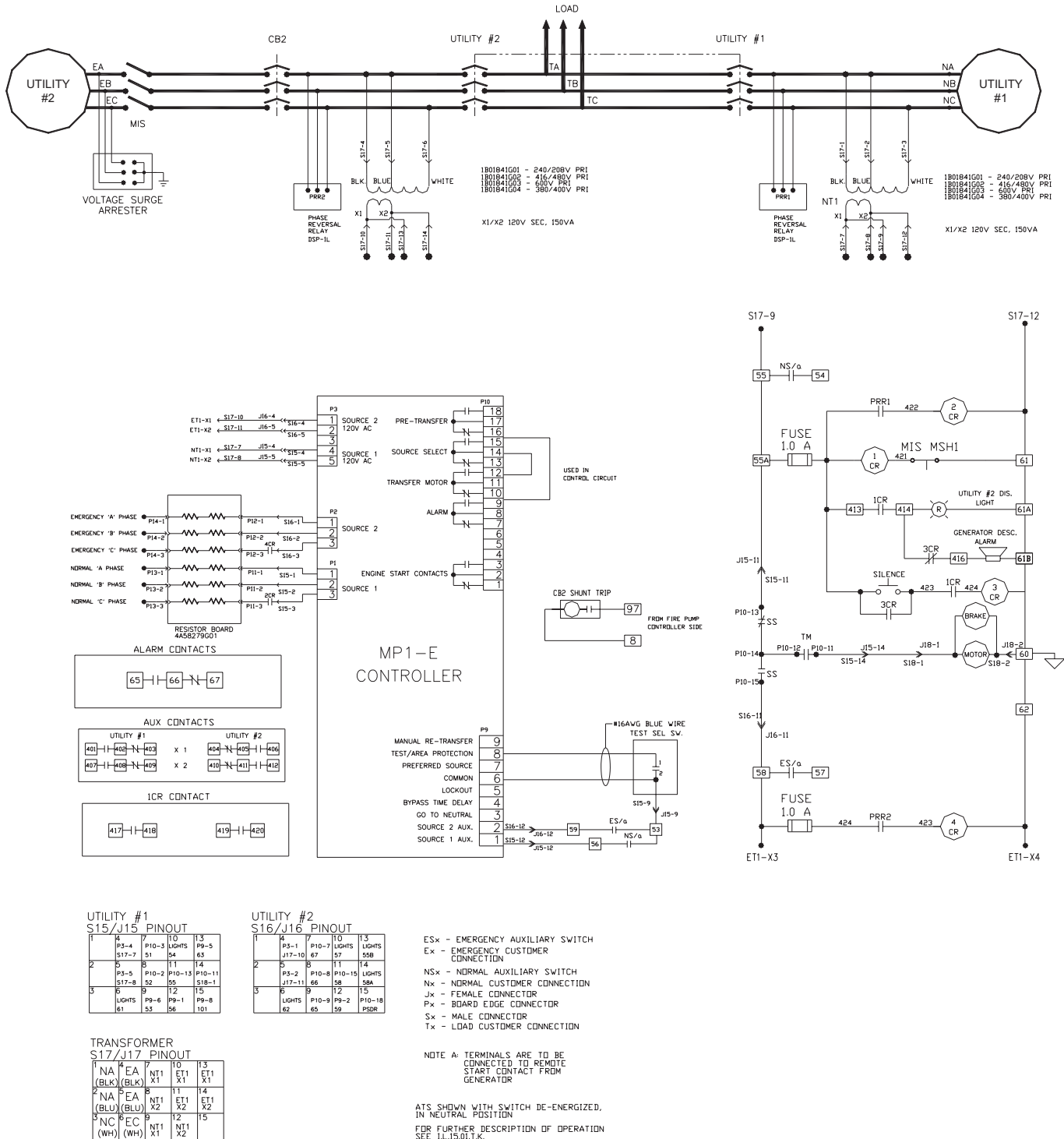


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## FTC Series - Compact

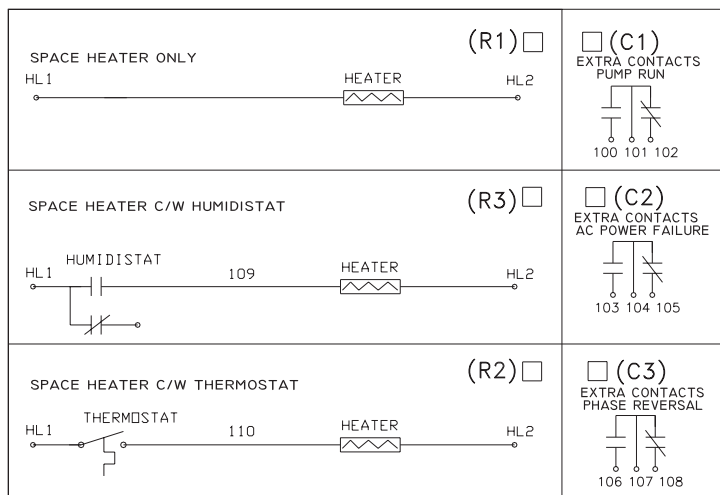
## Electrical Wiring Schematic

## FT2U Automatic Power Transfer Switch c/w Second Utility

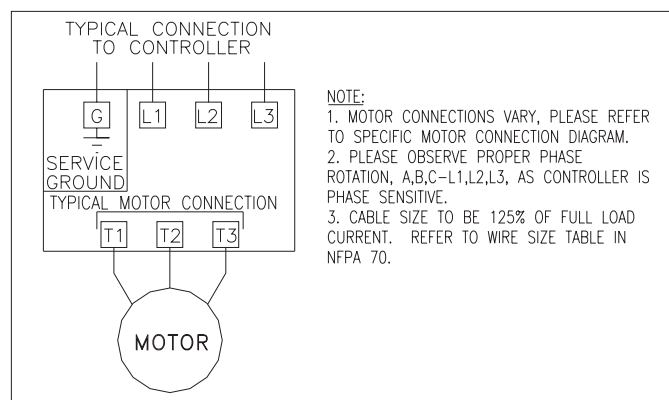


**FTC Series - Compact**

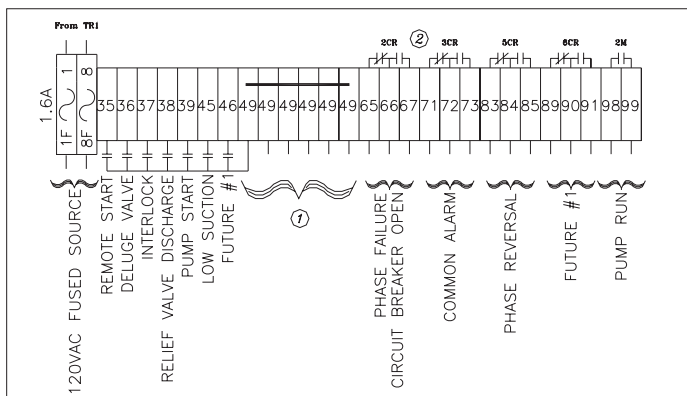
**Options - Wiring Diagram**



**Typical Controller Connection**

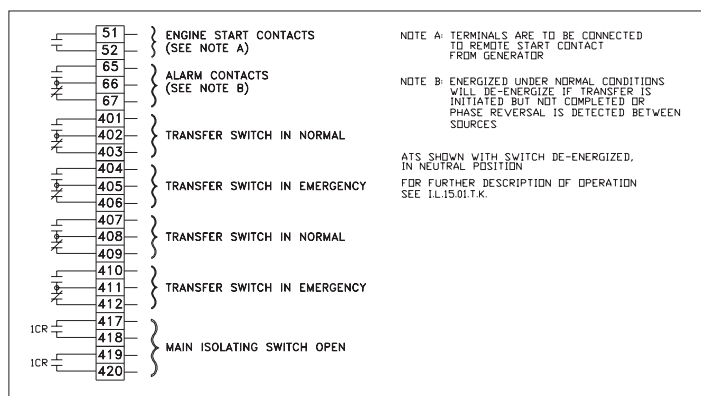


**Main Terminal Block: TB1**

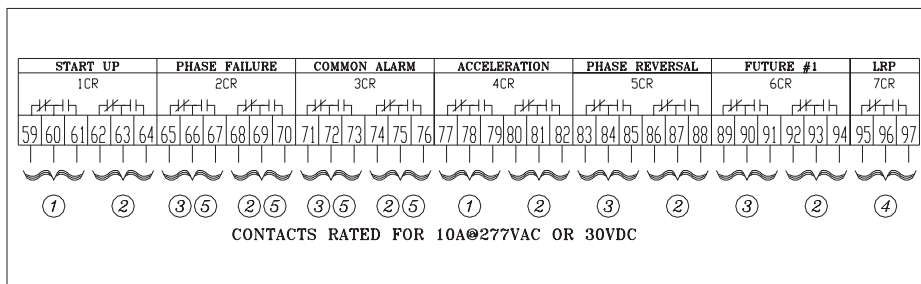


**NOTES:**  
 1. Terminal 49 is common to all dry contact inputs.  
 DO NOT APPLY A VOLTAGE ON THESE TERMINALS  
 2. Contacts shown in de-energized state (Fail Safe).

**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)