Installation Instructions

Original Instructions

Allen-Bradley

PowerFlex 400 AC Drive Packages for Fan and Pump

Catalog Number 23C

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

	**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
	**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.
	**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Chapter 3

Mechanical Installation

Chapter 4

Electrical Installation

Notes:

This manual contains new and updated information.

New and Updated Information

This table contains the changes made to this revision.

Topic	Page
Added ATTENTION statement clarifying branch circuit protection.	10
Updated Catalog Number Explanation to comply to current standards.	11
Added statement clarifying branch circuit protection.	13
Replaced Figure 4 with updated branch circuit protection drawing.	25
Replaced Figure 72 with updated branch circuit protection drawing.	105
Update part numbers for the Style A/B Fused Disconnect Packages, Operator Handle for NEMA/UL Type 1, 12, 3R, 4.	194
Added part numbers for Style M/N Circuit Breaker Packages Operator Handle (NEMA/UL Type 1/12) for Enclosure Options A and H and Operator Handle (NEMA/UL Type 3R/4) for Enclosure Options X and E.	196

Notes:

The purpose of this manual is to provide basic information that is needed to install, start-up, and troubleshoot PowerFlex® 400 Adjustable Frequency AC Drive Packages for Fan and Pump Applications.

User documentation for the PowerFlex 400 Drive Packages for Fan and Pump Applications includes these Installation Instructions and the PowerFlex 400 User Manual, publication 22C-UM001. Both manuals are required to properly install and operate the PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan and Pump Applications.

This manual is intended for qualified personnel. You must be able to program and operate Adjustable Frequency AC Drive devices. In addition, you must have an understanding of the parameter settings and functions.

The PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan and Pump Applications Installation Instructions is designed to provide only basic installation and operation information. For this reason, the following topics have not been included:

- Specifications
- Troubleshooting
- Startup
- Programming and Parameters

Refer to the PowerFlex 400 User Manual, publication 22C-UM001 for detailed drive information.

Manual Conventions

- To help differentiate parameter names and LCD display text from other text, the following conventions will be used:
  - Parameter Names appear in [brackets].
    For example: [DC Bus Voltage].
  - Display Text appear in “quotes.” For example: “Enabled.”
- The following words are used throughout the manual to describe an action:

Word	Meaning
Can	Possible, able to do something
Cannot	Not possible, not able to do something
May	Permitted, allowed
Must	Unavoidable, you must do this
Shall	Required and necessary
Should	Recommended
Should Not	Not recommended

General Precautions

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing, or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference Allen-Bradley® publication 8000-4.5.2, “Guarding Against Electrostatic Damage” or any other applicable ESD protection handbook.

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures may result in malfunction of the system.

ATTENTION: Only qualified personnel familiar with adjustable frequency AC drives and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

ATTENTION: To avoid an electric shock hazard, verify that the voltage on the bus capacitors has discharged before performing any work on the drive. Measure the voltage at the drive (Refer to the PowerFlex 400 User Manual, publication 22C-UM001for test point locations). The voltage must be zero.

ATTENTION: When provided with a circuit breaker, the circuit breaker serves as a disconnect only. Suitable branch circuit protection, such as fuses, need to be provided upstream of the circuit breaker.

Catalog Number Explanation

The PowerFlex 400 Adjustable Frequency AC Drive Packages for Fan and Pump Applications catalog numbering scheme is shown.

1…3	4	5	6-8	9	10	11	12	13	14	15	16	17	18	19+
23C	-	D	038	A	0	0	3	N	N	B	A	N	N	-LR
a		*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*

a

Drive	
Code	Type
23C	PowerFlex 400

b

Voltage Rating		
Code	Voltage	Phase
X	208V AC	3
D	480V AC	3

c1

Rating			
208V, 60 Hz Input			
Code	Amps(1)	kW (Hp)	Frame
012	12	2.2 (3.0)	C
017	16.8	3.7 (5.0)	C
024	24	5.5 (7.5)	C
033	30.8	7.5 (10)	C
049	46.2	11 (15)	D
065	64	15 (20)	D
075	75	18.5 (25)	D
090	88	22 (30)	D
120	114	30 (40)	E
145	143	37 (50)	E

(1) Configured drive amp ratings may differ from standalone drive ratings. Configured drives sized per NEC motor amps.

c2

Rating			
460V, 60 Hz Input			
Code	Amps(1)	kW (Hp)	Frame
6P0	4.8	2.2 (3.0)	C
010	7.6	4.0 (5.0)	C
012	11	5.5 (7.5)	C
017	14	7.5 (10)	C
022	21	11 (15)	C
030	27	15 (20)	C
038	34	18.5 (25)	D
045	40	22 (30)	D
060	52	30 (40)	D
072	65	37 (50)	E
088	77	45 (60)	E
105	96	55 (75)	E
142	124	75 (100)	E
170	156	90 (125)	F
208	180	110 (150)	F
260	240	132 (200)	G
310	302	160 (250)	G
370	361	200 (300)	H
460	414	250 (350)	H

(1) Configured amp ratings may differ from standalone drive ratings. Configured drives sized per NEC motor amps.

d

Enclosure	
Code	Enclosure
A	NEMA/UL Type 1
H	NEMA/UL Type 12 with Fan and Filter
X	NEMA/UL Type 3R(1)
E	NEMA/UL Type 4(1)

(1) Designed for maximum ambient temperature of 40° C with no direct sunlight exposure.

e

HIM	
Code	Interface Module
1	Fixed Keypad

f

Emission Class	
Code	Rating
0	Not Filtered

g

Version	
Code	Version
3	RS-485
B	BACnet Adapter
C	ControlNet® Adapter
D	DeviceNet® Adapter
E	EtherNet/IP™ Adapter
L	LonWorks Adapter
P	PROFIBUS DP Adapter

h

Code	Rating
N	Reserved

i

Code	Rating
N	Reserved

j

Package	
Code	Description
A	Main Input Disconnect(1)
B	3 Contactor Full Feature Bypass with(2) Disconnect
M	Main Input Circuit Breaker(3)
N	3 Contactor Full Feature Bypass with Circuit Breaker

(1) Not available with all ratings at 460V. Consult product selection tables for details.

(2) Not available with all ratings at 460V. Consult product selection tables for details.

(3) Available with all ratings in NEMA/UL Type 12, 3R, or 4 enclosures (Position d = H, X, or E) and 160…250 kW (250…350 Hp) ratings in NEMA/UL Type 1 enclosures (Position d = A).

k

Control	
Code	Description
A	Single Motor

l

Code	Rating
N	Reserved

m

Code	Rating
N	Reserved

n

Options	
Code	Description
-LR	3% Input Line Reactor(1)
-E5	Space Heater - Local Power(2)

(1) 3% Input Line Reactor not available for all package styles. Consult product selection tables for additional detail.

(2) Available with NEMA/UL Type 3R and 4 enclosures only.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Provides the basic information that is needed to properly wire and ground Pulse Width Modulated (PWM) AC drives.
Preventive Maintenance of Industrial Control and Drive System Equipment, publication DRIVES-TD001	Contains a checklist that can be used as a guide to perform preventive maintenance on variable frequency AC drives.
PowerFlex 400 User Manual, publication 22C-UM001	Provides the basic information that is needed to install, start-up, and troubleshoot the PowerFlex® 400 Adjustable Frequency AC Drive.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation® industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Main Input Disconnect Package (Style A/M)

This chapter describes the features and operation for the Main Input Disconnect Package (Style A/M).

Style Explanation

- Style A = Fused Disconnect
- Style M = Circuit Breaker

Hardware Overview

The Main Input Disconnect Package (Style A/M) combines an Adjustable Frequency AC Drive with a means for disconnecting input power within a package. Input power is connected to the PowerFlex® drive through a door interlocked fuse disconnect switch or circuit breaker.

Main Disconnect Switch (DS1)

An Allen-Bradley® Bulletin 194R™ Fused Disconnect Switch with lockable rotary-mounted operator handle is provided. The disconnect switch is designed to meet disconnect switch requirements for branch circuit protection. The door-mounted handle accepts up to three padlocks.

Main Circuit Breakers (CB1)

A circuit breaker with lockable rotary-mounted operator handle is provided. It is important to note that the circuit breaker serves as a disconnect only. Suitable branch circuit protection, such as fuses, need to be provided upstream of the circuit breaker. The door-mounted handle accepts up to three padlocks.

Main Fuses (FU1-FU3)

ATTENTION: Most codes require that upstream branch circuit protection be provided to help protect input power wiring. Install the fuses recommended in Table 1. Do not exceed the fuse ratings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Input line branch circuit protection fuses must be used to help protect the input power lines. If input fuses are not provided with your drive, see the recommended fuse values shown in Table 1. The input fuse ratings that are listed in Table 1 are applicable for one drive per branch circuit. No other load may be applied to that fused circuit.

The recommended fuse type for all PowerFlex 400 Drive Packages for Fan and Pump Applications is UL Class J.

Table 1 - Fuse Recommendations

Drive Rating			Fuse Rating
Input Voltage	**kW**	**Hp**	**Amps**
208V AC – 3 Phase	2.2	3.0	20
	3.7	5.0	20
	5.5	7.5	35
	7.5	10	40
	11	15	80
	15	20	100
	18.5	25	125
	22	30	150
	30	40	200
	37	50	250
460V AC – 3 Phase	2.2	3.0	10
	4.0	5.0	15
	5.5	7.5	20
	7.5	10	20
	11	15	35
	15	20	35
	18.5	25	60
	22	30	70
	30	40	80
	37	50	100
	45	60	150
	55	75	175
	75	100	200
	90	125	250
	110	150	350
	132	200	400
	160	250	500
	200	300	600
	250	350	700

Electrical Installation

Input Power Wiring

Use 75 °C rated copper conductors only for customer power wiring.

See the PowerFlex 400 User Manual, publication 22C-UM001 for additional detailed information about input power wiring recommendations and selection.

ATTENTION: Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive package:

❑ 1. Select the proper wire size according to NEC and all applicable local codes and standards. You must punch openings in the Option Cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. Power terminal block specifications are listed in Table 2.

❑ 2. Connect the three-phase AC input power leads (three-wire VAC) to the appropriate terminals. Connect the AC input power leads to terminals L1, L2, L3 on the fused disconnect switch.

❑ 3. Tighten the AC input terminal power terminals to the proper torque according to drive type as shown in Table 2.

Table 2 - AC Input Power Terminal Block Specifications

Volts AC	kW	Hp	Maximum Wire Size(1)	Minimum Wire Size	Recommended Torque
208V	2.2…3.7	3.0…5.0	8.4 mm² (8 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	5.5…7.5	7.5…10	16.0 mm² (4 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	11…15	15…20	33.6 mm² (2 AWG)	2.5 mm² (14 AWG)	17.5 N•m (155 lb•in)
	18.5…30	25…40	250 MCM	10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	37	50	350 MCM	35.0 mm² (1/0 AWG)	31.1 N•m (275 lb•in)
460V	2.2…7.5	3.0…10	8.4 mm² (8 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	11…18.5	15…25	16.0 mm² (4 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	22…37	30…50	33.6 mm² (2 AWG)	2.5 mm² (14 AWG)	17.5 N•m (155 lb•in)
	45…75	60…100	250 MCM	10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	90…110	125…150	(2) 350 MCM	(2) 10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	132	200	(2) 350 MCM	(2) 35.0 mm² (1/0 AWG)	31.1 N•m (275 lb•in)
	160…200	250…300	(2) 350 MCM	(2) 70.0 mm² (3/0 AWG)	31.1 N•m (275 lb•in)
	250	350	(2) 400 MCM	(2) 70.0 mm² (3/0 AWG)	31.1 N•m (275 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

Output Power Wiring

See the PowerFlex 400 User Manual, publication 22C-UM001 for additional detailed information about output power wiring recommendations and selection.

ATTENTION: Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard that is caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC output power wiring from the drive to the motor:

❑ **1.** Wire the three-phase AC output power motor leads by routing them according to the drive option type. You must punch openings in the option cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. Power terminal block specifications are listed in Table 3.

Do not route more than three sets of motor leads through a conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ **2.** Connect the three-phase AC output power motor leads to terminals U, V, W (T1, T2, T3) on the power terminal block on the drive.

❑ **3.** Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 3.

Table 3 - AC Output Power Terminal Block Specifications

Volts AC	kW	Hp	Maximum Wire Size(1)	Minimum Wire Size	Recommended Torque
208V	2.2…7.5	3.0…10	8.4 mm^2 (8 AWG)	1.3 mm^2 (16 AWG)	3.7 N•m (33 lb•in)
	11…22	15…30	33.6 mm^2 (2 AWG)	8.4 mm^2 (8 AWG)	5.1 N•m (45 lb•in)
	30…37	40…50	33.6 mm^2 (2 AWG)	2.5 mm^2 (14 AWG)	17.5 N•m (155 lb•in)
460V	2.2…15	3.0…20	8.4 mm^2 (8 AWG)	1.3 mm^2 (16 AWG)	3.7 N•m (33 lb•in)
	18.5…30	25…40	33.6 mm^2 (2 AWG)	8.4 mm^2 (8 AWG)	5.1 N•m (45 lb•in)
	37…45	50…60	33.6 mm^2 (2 AWG)	3.5 mm^2 (12 AWG)	5.6 N•m (49.5 lb•in)
	55…75	75…100	107.2 mm^2 (4/0 AWG)	53.5 mm^2 (1/0 AWG)	19.5 N•m (173 lb•in)
	90…110	125…150	300 MCM	70.0 mm^2 (3/0 AWG)	19.5 N•m (173 lb•in)
	132…160	200…250	300 MCM	107.2 mm^2 (4/0 AWG)	29.4 N•m (260 lb•in)
	200…250	300…350	500 MCM	300 MCM	40.0 N•m (354 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

Control and Signal Wiring

See the PowerFlex 400 User Manual, publication 22C-UM001 for additional detailed information about control and signal wiring.

The Control I/O Terminal Block (TB1) and Relay Terminal Block (TB2) on the drive Main Control Board provide terminals for interfacing customer supplied control inputs and outputs. All analog and discrete control wiring will be made at these terminals. Typical customer control and signal wiring are shown on the Interconnect Drawings Figure 8 on page 29 and Figure 9 on page 30.

To connect control and signal wiring to the drive package:

❑ **1.** Wire the control and signal leads by routing them according to the drive option type. You must punch openings in the option cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. I/O terminal block specifications are listed in Table 4.

Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

❑ **2.** Connect the control and signal wiring to the I/O terminals on the drive.

❑ **3.** Tighten the I/O terminals to the proper torque according to drive type as shown in Table 4.

Table 4 - I/O Terminal Block Specifications

Voltage Rating	Maximum Wire Size(1)	Minimum Wire Size	Torque
208…460V AC	1.3 mm^2 (16 AWG)	0.13 mm^2 (26 AWG)	0.5…0.8 N•m (4.4…7 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

Parameter Defaults (Style A/M)

Parameter Name	Number	Default
Output Freq	b001	Read Only
Commanded Freq	b002	Read Only
Output Current	b003	Read Only
Output Voltage	b004	Read Only
DC Bus Voltage	b005	Read Only
Drive Status	b006	Read Only
Fault 1 Code	b007	Read Only
Process Display	b008	Read Only
Output Power	b010	Read Only
Elapsed MWh	b011	Read Only
Elapsed Run Time	b012	Read Only
Torque Current	b013	Read Only
Drive Temp	b014	Read Only
Elapsed kWh	b015	Read Only
Motor NP Volts	P031	Drive Rated Volts
Motor NP Hertz	P032	60 Hz
Motor OL Current	P033	Drive Rated Amps
Minimum Freq	P034	0.0 Hz
Maximum Freq	P035	60 Hz
Start Source	P036	6 "2-W Lvl/Enbl" (1)
Stop Mode	P037	1 "Coast, CF"
Speed Reference	P038	2 "Analog In1"
Accel Time 1	P039	20.00 Secs
Decel Time 1	P040	20.00 Secs
Reset To Defaults	P041	0 "Ready/Idle"
Auto Mode	P042	1 "Hnd-Off-Auto"
Digital In1 Sel	T051	1 "Purge"
Digital In2 Sel	T052	3 "Local"
Digital In3 Sel	T053	10 "Clear Fault"
Digital In4 Sel	T054	4 "Comm Port"
Relay Out1 Sel	T055	0 "Ready/Fault"
Relay Out1 Level	T056	0.0
Relay 1 On Time	T058	0.0 Secs
Relay 1 Off Time	T059	0.0 Secs
Relay Out2 Sel	T060	2 "MotorRunning"
Relay Out2 Level	T061	0.0
Relay 2 On Time	T063	0.0 Secs
Relay 2 Off Time	T064	0.0 Secs
Opto Out Sel	T065	1 "At Frequency"
Opto Out Level	T066	0.0
Opto Out Logic	T068	0 "Normally Open"
Analog In 1 Sel	T069	2 "0-10V"
Analog In 1 Lo	T070	0.0%
Analog In 1 Hi	T071	100.0%
Analog In 1 Loss	T072	0 "Disabled"
Analog In 2 Sel	T073	1 "4-20 mA" (1)
Analog In 2 Lo	T074	0.0%
Analog In 2 Hi	T075	100.0%
Analog In 2 Loss	T076	0 "Disabled"
Sleep-Wake Sel	T077	0 "Disabled"
Sleep Level	T078	10.0%
Sleep Time	T079	0.0 Secs
Wake Level	T080	15.0%
Wake Time	T081	0.0 Secs
Analog Out1 Sel	T082	0 "OutFreq 0-10"
Analog Out1 High	T083	100%
Analog Out1 Setpt	T084	0.0%
Analog Out2 Sel	T085	1 "OutCurr 0-10"
Analog Out2 High	T086	100%
Analog Out2 Setpt	T087	0.0%
Language	C101	1 "English"
Comm Format	C102	0 "RTU 8-N-1"
Comm Data Rate	C103	3 "9600"
Comm Node Addr	C104	100
Comm Loss Action	C105	0 "Fault"
Comm Loss Time	C106	5.0 Secs

Parameter Name	Number	Default
Comm Write Mode	C107	0 "Save"
Purge Frequency	A141	5.0 Hz
Internal Freq	A142	60.00 Hz
Preset Freq 0	A143	0.0 Hz
Preset Freq 1	A144	5.0 Hz
Preset Freq 2	A145	10.0 Hz
Preset Freq 3	A146	20.0 Hz
Accel Time 2	A147	30.00 Secs
Decel Time 2	A148	30.00 Secs
S Curve%	A149	20%
PID Trim Hi	A150	60.0 Hz
PID Trim Lo	A151	0.0 Hz
PID Ref Sel	A152	0 "PID Disabled"
PID Feedback Sel	A153	0 "Analog In 1"
PID Prop Gain	A154	0.01
PID Integ Time	A155	2.0 Secs
PID Diff Rate	A156	0.00
PID Setpoint	A157	0.0%
PID Deadband	A158	0.0%
PID Preload	A159	0.0 Hz
Process Factor	A160	30.0
Auto Rstrt Tries	A163	0
Auto Rstrt Delay	A164	1.0 Secs
Start At PowerUp	A165	1 "Enabled" (1)
Reverse Disable	A166	1 "Rev Disabled"
Flying Start En	A167	1 "Enabled" (1)
PWM Frequency	A168	4.0 kHz
PWM Mode	A169	1 "2-Phase"
Boost Select	A170	4 "45.0, VT"
Start Boost	A171	2.5%
Break Voltage	A172	25.0%
Break Frequency	A173	15.0 Hz
Maximum Voltage	A174	Drive Rated Volts
Slip Hertz @ FLA	A175	2.0 Hz
DC Brake Time	A176	0.0 Secs
DC Brake Level	A177	Drive Rated Amps
DC Brk Time@Strt	A178	0 (Disabled)
Current Limit 1	A179	Drive Rated Amps
Current Limit 2	A180	Drive Rated Amps
Motor OL Select	A181	0 "No Derate"
Drive OL Mode	A182	3 "Both-PWM 1st"
SW Current Trip	A183	0.0 (Disabled)
Load Loss Level	A184	0.0 (Disabled)
Load Loss Time	A185	0 Secs
Stall Fault Time	A186	0 "60 Seconds"
Bus Reg Mode	A187	1 "Enabled"
Skip Frequency 1	A188	0 Hz
Skip Freq Band 1	A189	0.0 Hz
Skip Frequency 2	A190	0 Hz
Skip Freq Band 2	A191	0.0 Hz
Skip Frequency 3	A192	0 Hz
Skip Freq Band 3	A193	0.0 Hz
Compensation	A194	1 "Electrical"
Reset Meters	A195	0 "Ready/Idle"
Testpoint Sel	A196	400
Fault Clear	A197	0 "Ready/Idle"
Program Lock	A198	0 "Unlocked"
Motor NP Poles	A199	4
Relay Out3 Sel	R221	0 "Ready/Fault"
Relay Out3 Level	R222	0.0
Relay Out4 Sel	R224	0 "Ready/Fault"
Relay Out4 Level	R225	0.0
Relay Out5 Sel	R227	0 "Ready/Fault"
Relay Out5 Level	R228	0.0
Relay Out6 Sel	R230	0 "Ready/Fault"
Relay Out6 Level	R231	0.0
Relay Out7 Sel	R233	0 "Ready/Fault"
Relay Out7 Level	R234	0.0
Relay Out8 Sel	R236	0 "Ready/Fault"

Parameter Name	Number	Default
Relay Out8 Level	R237	0.0
Aux Motor Mode	R239	0 "Disabled"
Aux Motor Qty	R240	1 "1 Aux Mtr"
Aux 1 Start Freq	R241	50.0 Hz
Aux 1 Stop Freq	R242	25.0 Hz
Aux 1 Ref Add	R243	0.0%
Aux 2 Start Freq	R244	50.0 Hz
Aux 2 Stop Freq	R245	25.0 Hz
Aux 2 Ref Add	R246	0.0%
Aux 3 Start Freq	R247	50.0 Hz
Aux 3 Stop Freq	R248	25.0 Hz
Aux 3 Ref Add	R249	0.0%
Aux Start Delay	R250	5.0 Secs
Aux Stop Delay	R251	3.0 Secs
Aux Prog Delay	R252	0.50 Secs
Aux AutoSwap Tme	R253	0.0 Hr
Aux AutoSwap Lvl	R254	50.0%
Control Source	d301	Read Only
Contrl In Status	d302	Read Only
Comm Status	d303	Read Only
PID Setpnt Displ	d304	Read Only
Analog In 1	d305	Read Only
Analog In 2	d306	Read Only
Fault 1 Code	d307	Read Only
Fault 2 Code	d308	Read Only
Fault 3 Code	d309	Read Only
Fault 1 Time-hr	d310	Read Only
Fault 1 Time-min	d311	Read Only
Fault 2 Time-hr	d312	Read Only
Fault 2 Time-min	d313	Read Only
Fault 3 Time-hr	d314	Read Only
Fault 3 Time-min	d315	Read Only
Elapsed Time-hr	d316	Read Only
Elapsed Time-min	d317	Read Only
Output Powr Fctr	d318	Read Only
Testpoint Data	d319	Read Only
Control SW Ver	d320	Read Only
Drive Type	d321	Read Only
Output Speed	d322	Read Only
Output RPM	d323	Read Only
Fault Frequency	d324	Read Only
Fault Current	d325	Read Only
Fault Bus Volts	d326	Read Only
Status @ Fault	d327	Read Only

(1) The default values of these parameters differ from Factory Defaults. Setting P041 [Reset To Defaults] to 1 "Factory Reset" will change these parameter settings to the defaults list in the PowerFlex 400 User Manual, publication 22C-UM001.

ATTENTION: Parameter A165 [Start At PowerUp] ships from the factory enabled. This feature allows a Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national, and international codes, standards, regulations or industry guidelines.

Drawing Index

208V AC Input – Main Input Disconnect Drive Packages (Style A/M)

Input Voltage	Type	Hp	Input Line Reactor	Drawing								Hp	Style
				SchematicPage		InterconnectPage		LayoutPage		OutlinePage			
208V AC	NEMA/UL Type 1	3	No	98D00697	22	97D00696	29	95D00758	34	95D00689	70	3	A
		5										5	
		7.5										7.5	
		10										10	
		15						95D00759	35	95D00691	71	15	
		20										20	
		25						95D00775	36	95D00692	72	25	
		30										30	
		40						95D00760	37	95D00693	73	40	
		50						95D00776	38	95D00694	74	50	
		3	Yes	98D00756	23	97D00754	30	95D00791	42	95D00690	78	3	
		5										5	
		7.5						95D00792	43	95D00753	79	7.5	
		10										10	
		15						95D01367	44	95D01359	80	15	
		20										20	
		25						95D01368	45	95D01360	81	25	
		30										30	
		40						95D01369	46	95D01361	82	40	
		50										50	
	NEMA/UL Type 12	3	With or Without	98D01535	26	97D01548	33	95D01575	48	95D01552	84	3	A & M
		5										5	
		7.5										7.5	
		10										10	
		15						95D01576	49			15	
		20										20	
		25						95D02451	50			25	
		30										30	
		40						95D02497	51			40	
		50										50	
	NEMA/UL Type 4	3	With or Without	98D01537	27	97D01548	33	95D01563	56	95D01551	85	3	
		5										5	
		7.5										7.5	
		10										10	
		15						95D01565	57			15	
		20										20	
		25						95D02455	58			25	
		30										30	
		40						95D02495	59			40	
		50										50	
	NEMA/UL Type 3R	3	With or Without	98D01535	26	97D01548	33	95D01553	63	95D01550	86	3	
		5										5	
		7.5										7.5	
		10										10	
		15						95D01554	64			15	
		20										20	
		25						95D02453	65			25	
		30										30	
		40						95D02493	66			40	
		50										50	

460V AC – Main Input Disconnect Drive Packages (Style A/M)

Input Voltage	Type	Hp	Input Line Reactor	Drawing								Hp	Style
				SchematicPage		InterconnectPage		LayoutPage		OutlinePage			
460V AC	NEMA/UL Type 1	3	No	98D00697	22	97D00696	29	95D00758	34	95D00689	70	3	A
		5										5	
		7.5										7.5	
		10										10	
		15										15	
		20										20	
		25						95D00759	35	95D00691	71	25	
		30										30	
		40										40	
		50						95D00760	37	95D00693	73	50	
		60										60	
		75										75	
		100										100	
		125						95D01262	39	95D01264	75	125	
		150										150	
		200		98D01888	24	97D01890	31	95D01862	40	95D01866	76	200	
		250		98D01887	25	97D01889	32					250	M
		300						95D01864	41	95D01868	77	300	
		350										350	
		3	Yes	98D00756	23	97D00754	30	95D00791	42	95D00690	78	3	A
		5										5	
		7.5										7.5	
		10										10	
		15						95D00792	43	95D00753	79	15	
		20										20	
		25						95D01367	44	95D01359	80	25	
		30										30	
		40										40	
		50						95D01369	46	95D01361	82	50	
		60										60	
		75										75	
		100										100	
		125						95D01370	47	95D01362	83	125	
		150										150	
	NEMA/UL Type 12	3	With or Without	98D01535	26	97D01548	33	95D01575	48	95D01552	84	3	A & M
		5										5	
		7.5										7.5	
		10										10	
		15										15	
		20										20	
		25						95D01576	49			25	
		30										30	
		40										40	
		50						95D02470	52			50	
		60										60	
		75						95D02476	53			75	
		100										100	
		125						95D01579	54			125	
		150										150	

Input Voltage	Type	Hp	Input Line Reactor	Drawing				Hp	Style
				SchematicPage	InterconnectPage	LayoutPage	OutlinePage		
460V AC	NEMA/UL Type 4	3	With or Without	98D01537 27	97D01548 33	95D02442 55	95D01551 85	3	A & M
		5						5	
		7.5				95D01563 56		7.5	
		10						10	
		15						15	
		20						20	
		25				95D01565 57		25	
		30						30	
		40						40	
		50				95D02469 60		50	
		60						60	
		75				95D02475 61		75	
		100						100	
		125		98D01538 28		95D01568 62		125	
		150						150	
	NEMA/UL Type 3R	3	With or Without	98D01535 26	97D01548 33	95D01553 63	95D01550 86	3	
		5						5	
		7.5						7.5	
		10						10	
		15						15	
		20						20	
		25				95D01554 64		25	
		30						30	
		40						40	
		50				95D02468 67		50	
		60						60	
		75				95D02474 68		75	
		100						100	
		125				95D01557 69		125	
		150						150	

Schematic Drawings

Figure 1 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 1

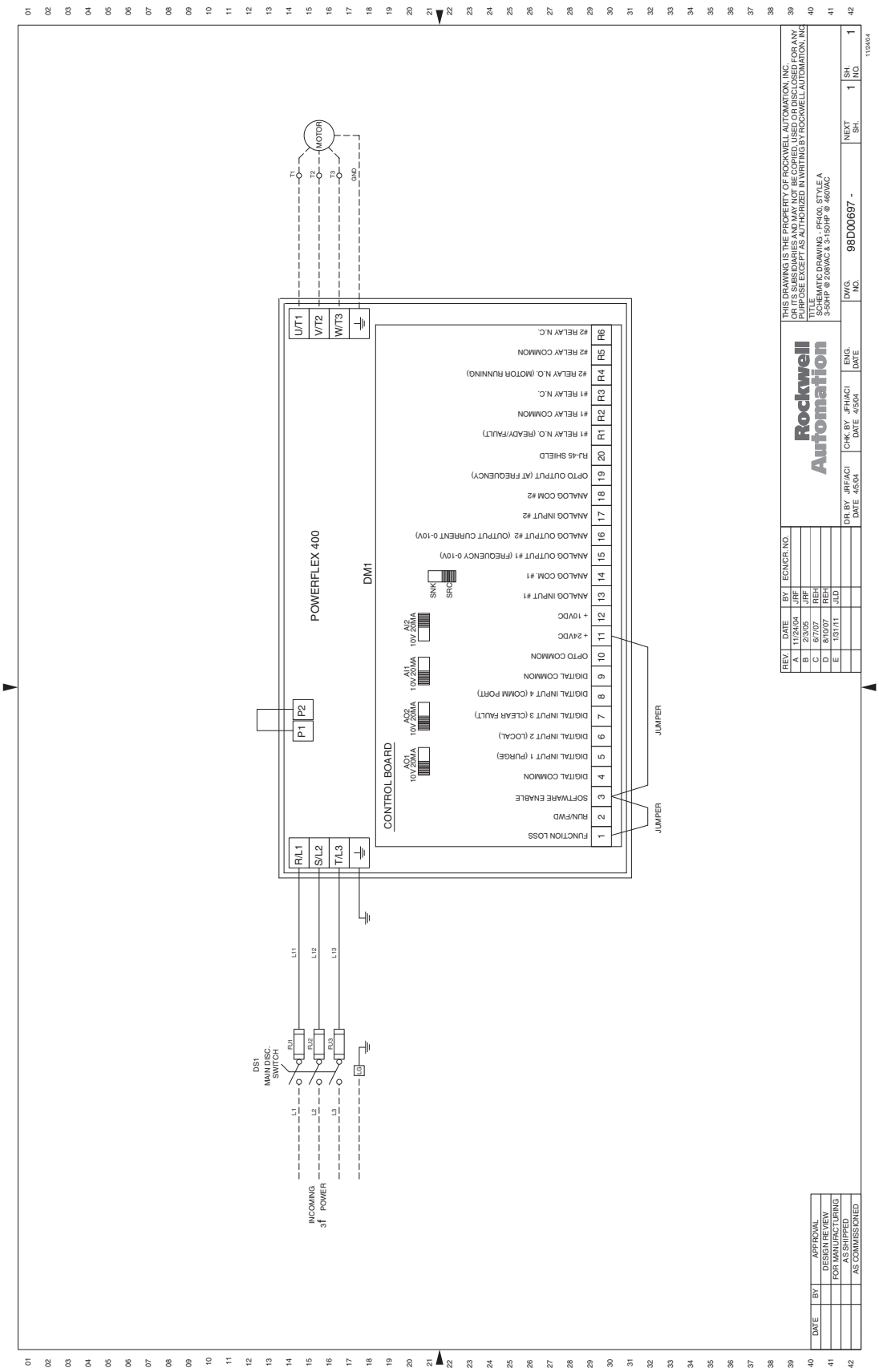


Figure 2 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

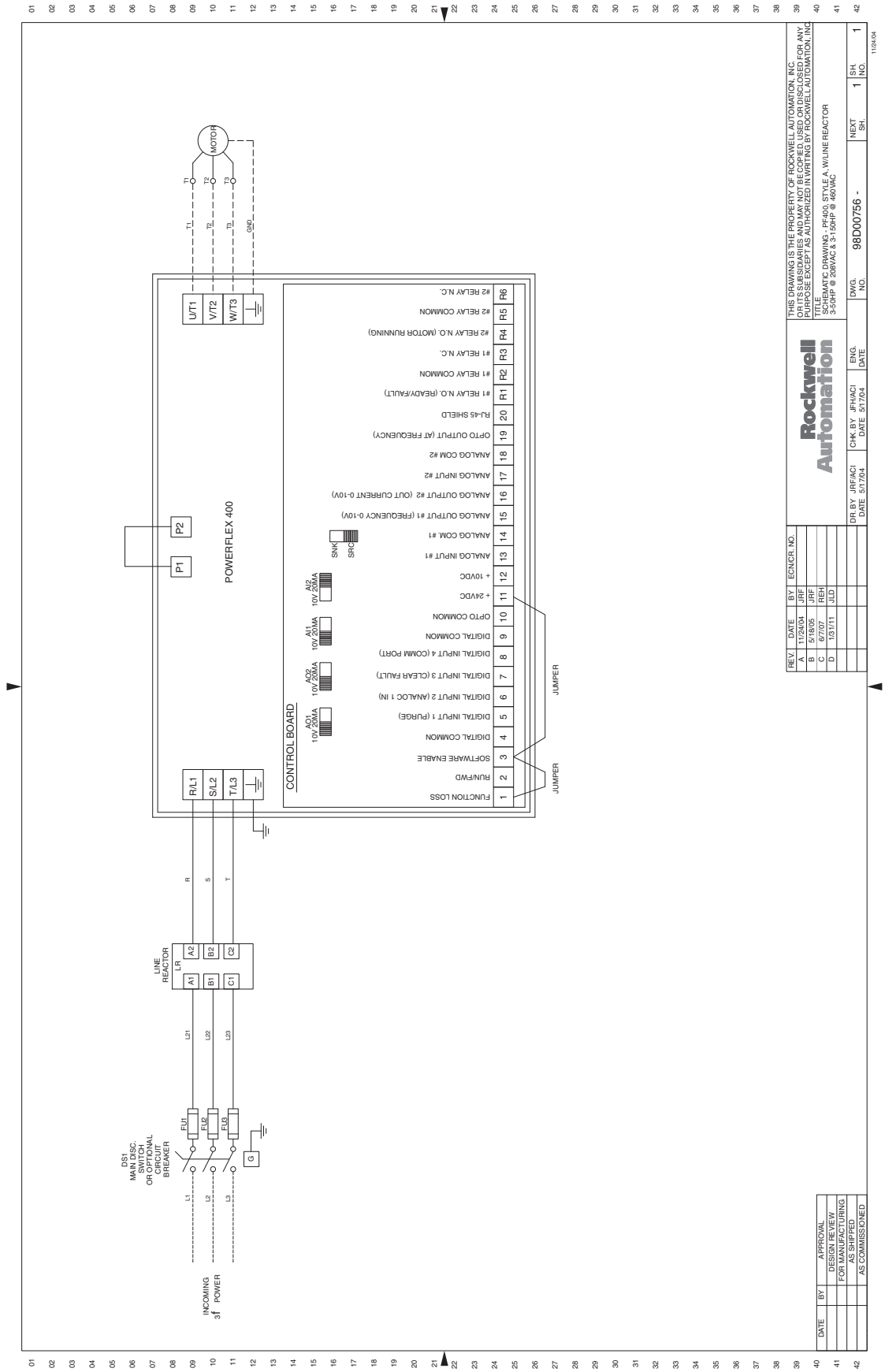


Figure 3 - 200 Hp, 460V AC Drives - NEMA/UL Type 1

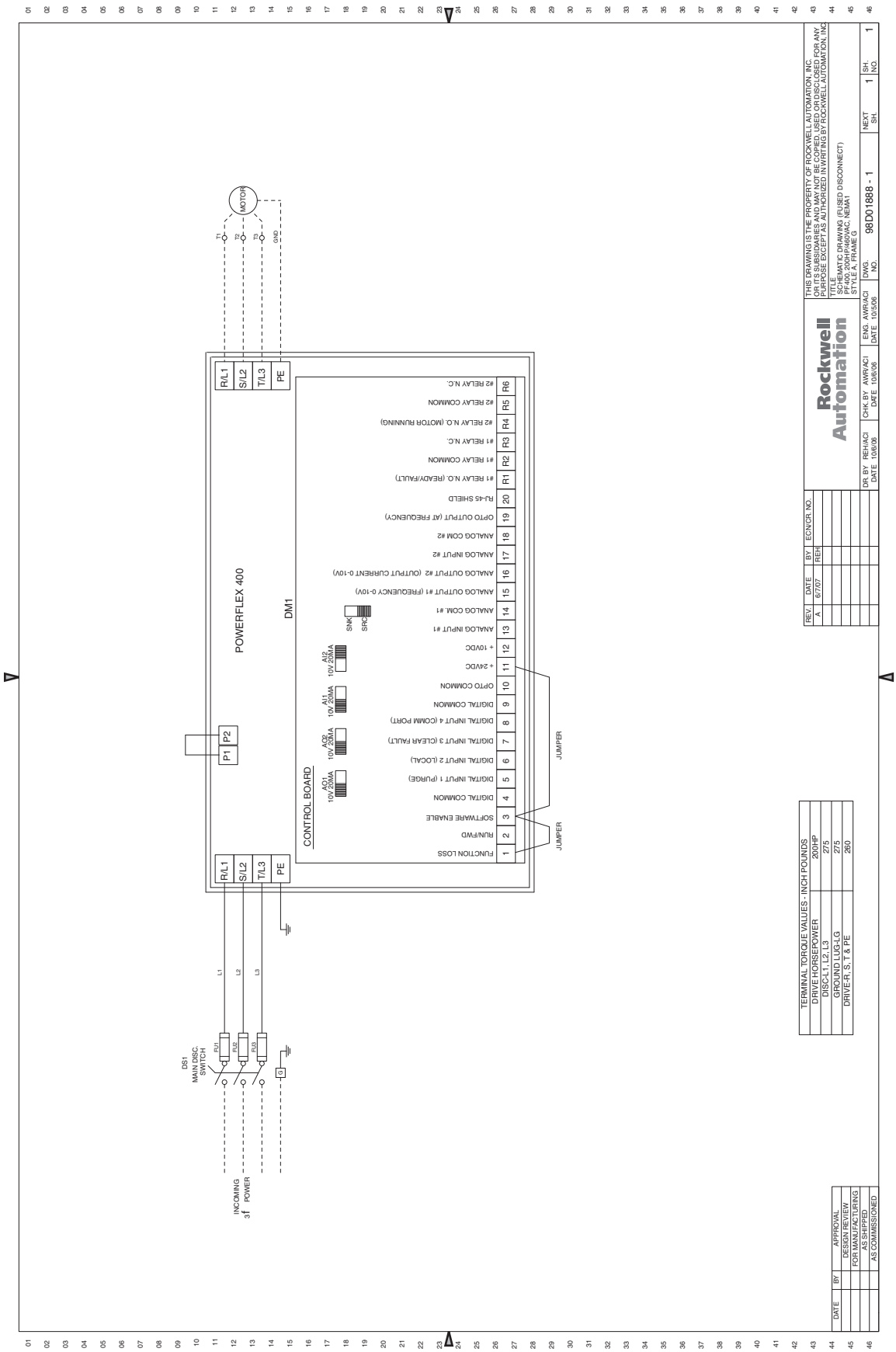


Figure 4 - 250…350 Hp, 460V AC Drives - NEMA/UL Type 1

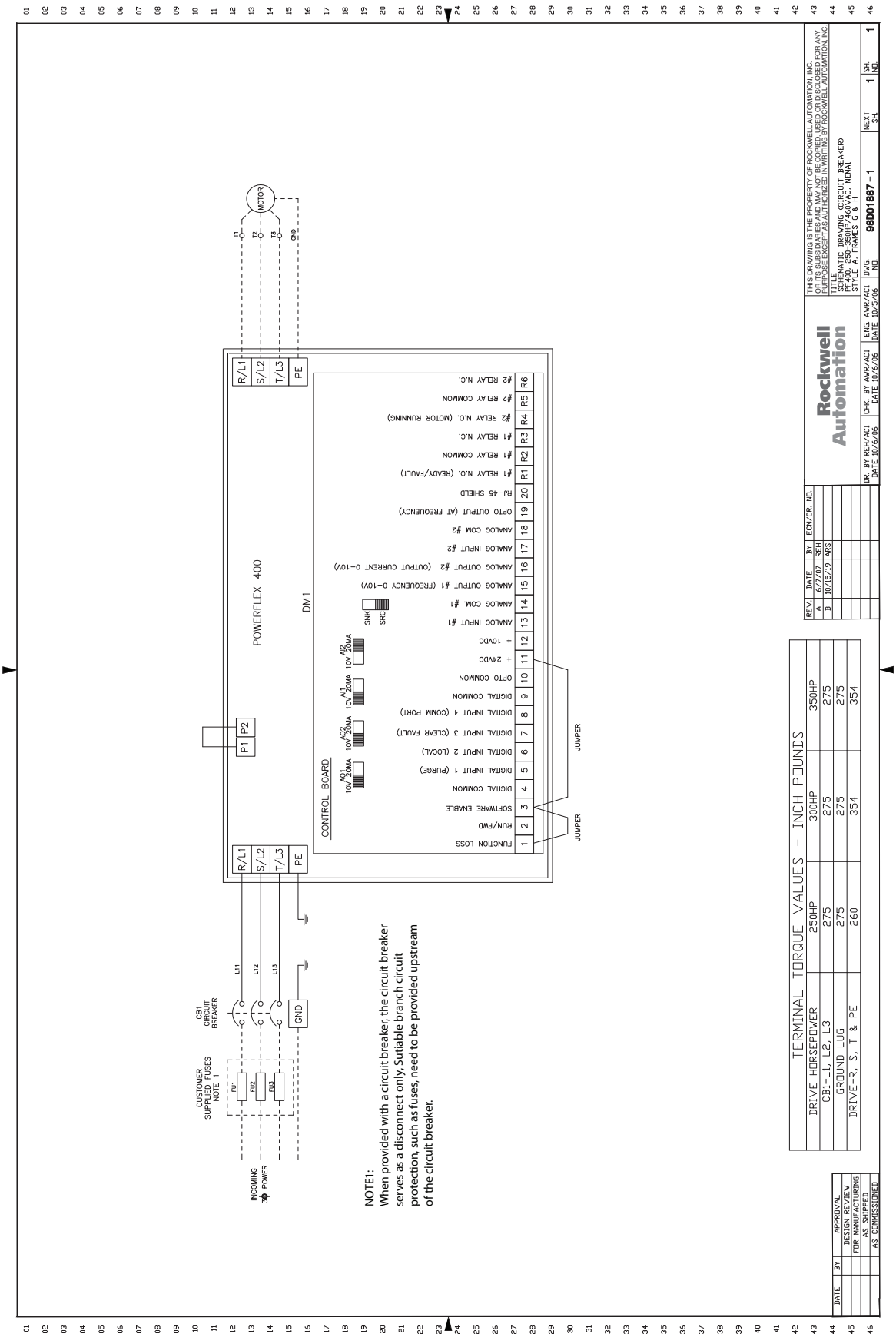


Figure 5 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12 and 3R

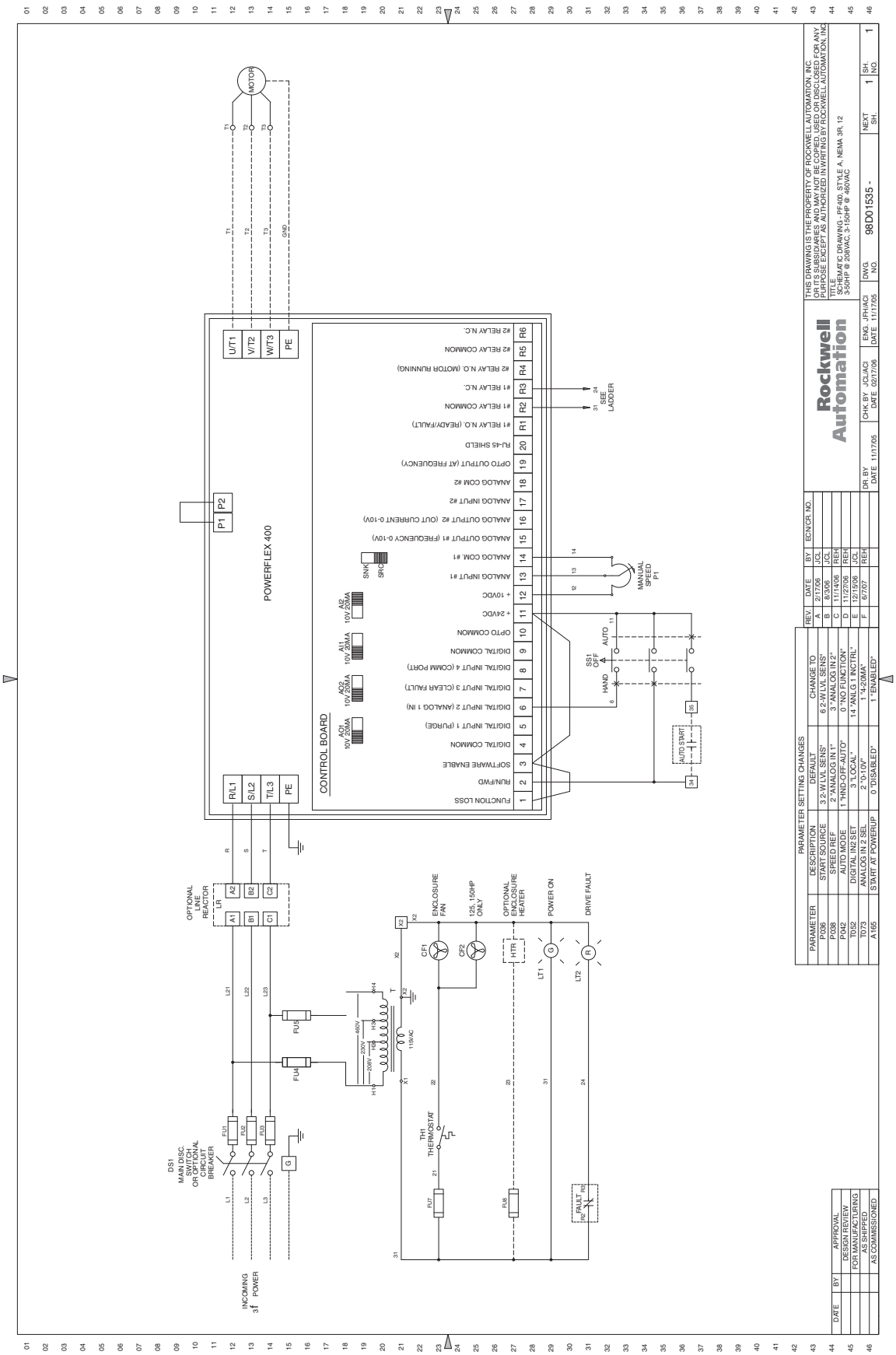


Figure 6 - 3.0…50 Hp, 208V AC and 3.0…100 Hp, 460V AC Drives - NEMA/UL Type 4

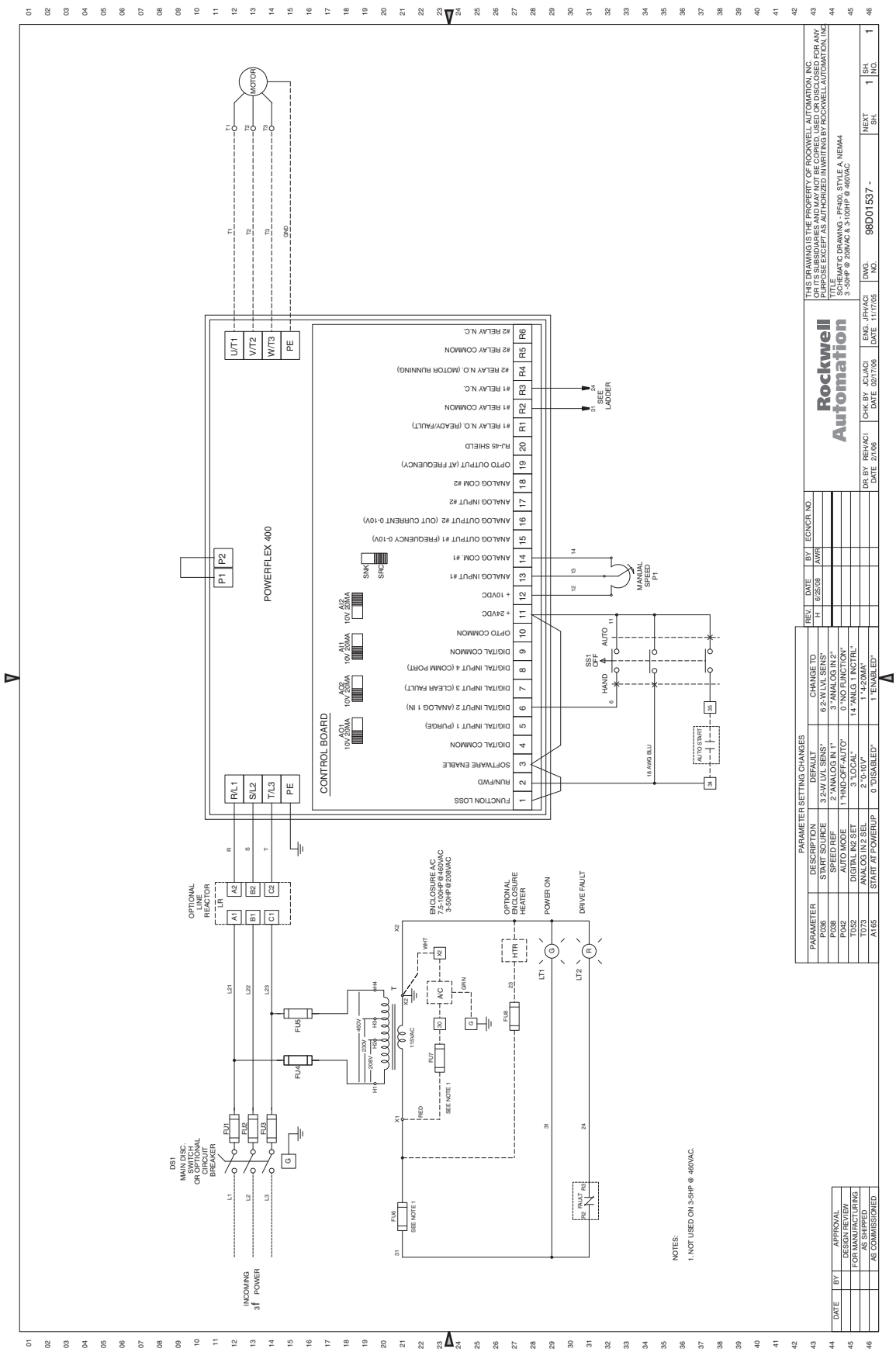
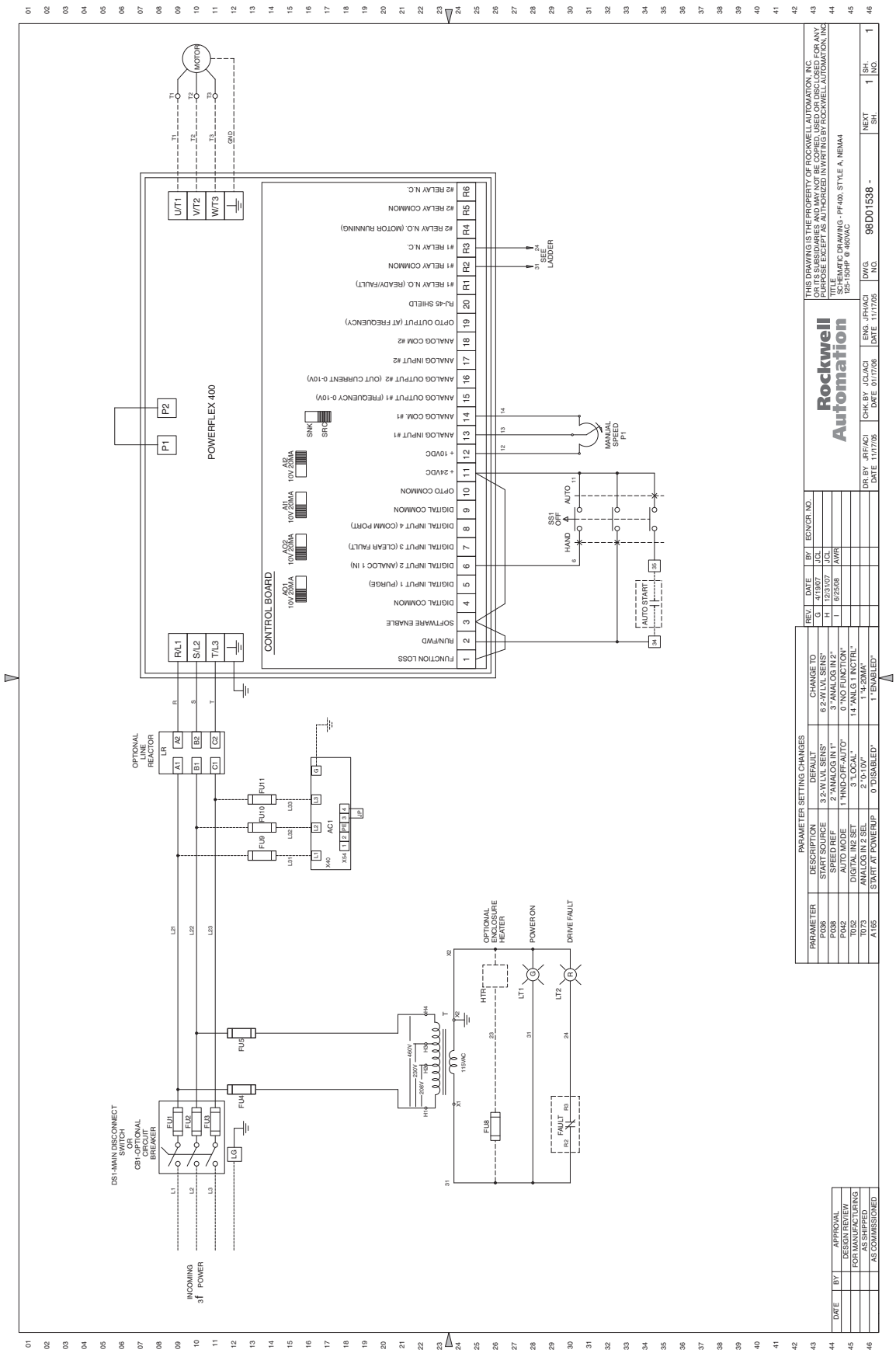


Figure 7 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 4



Interconnect Drawings

Figure 8 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 1

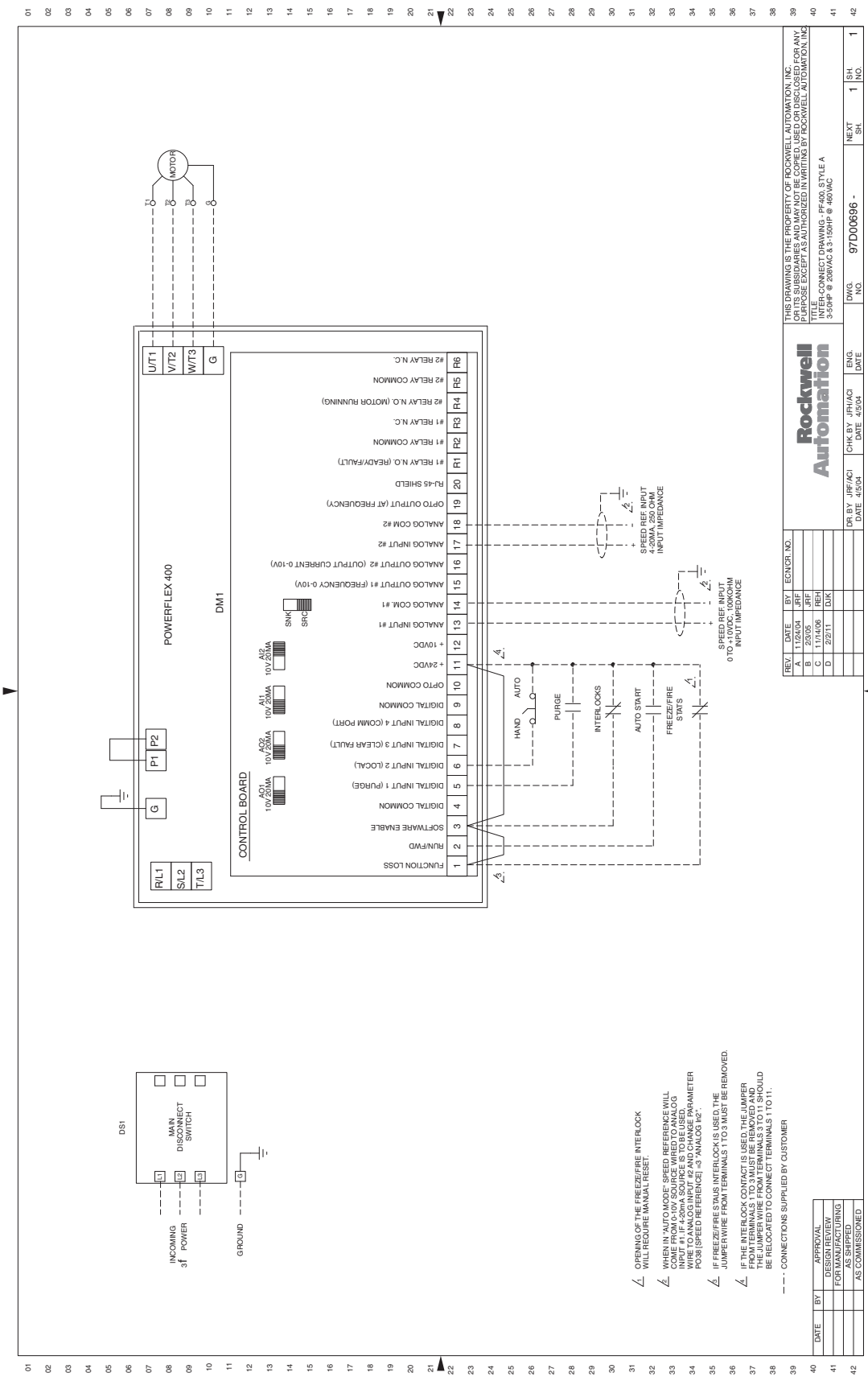


Figure 9 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

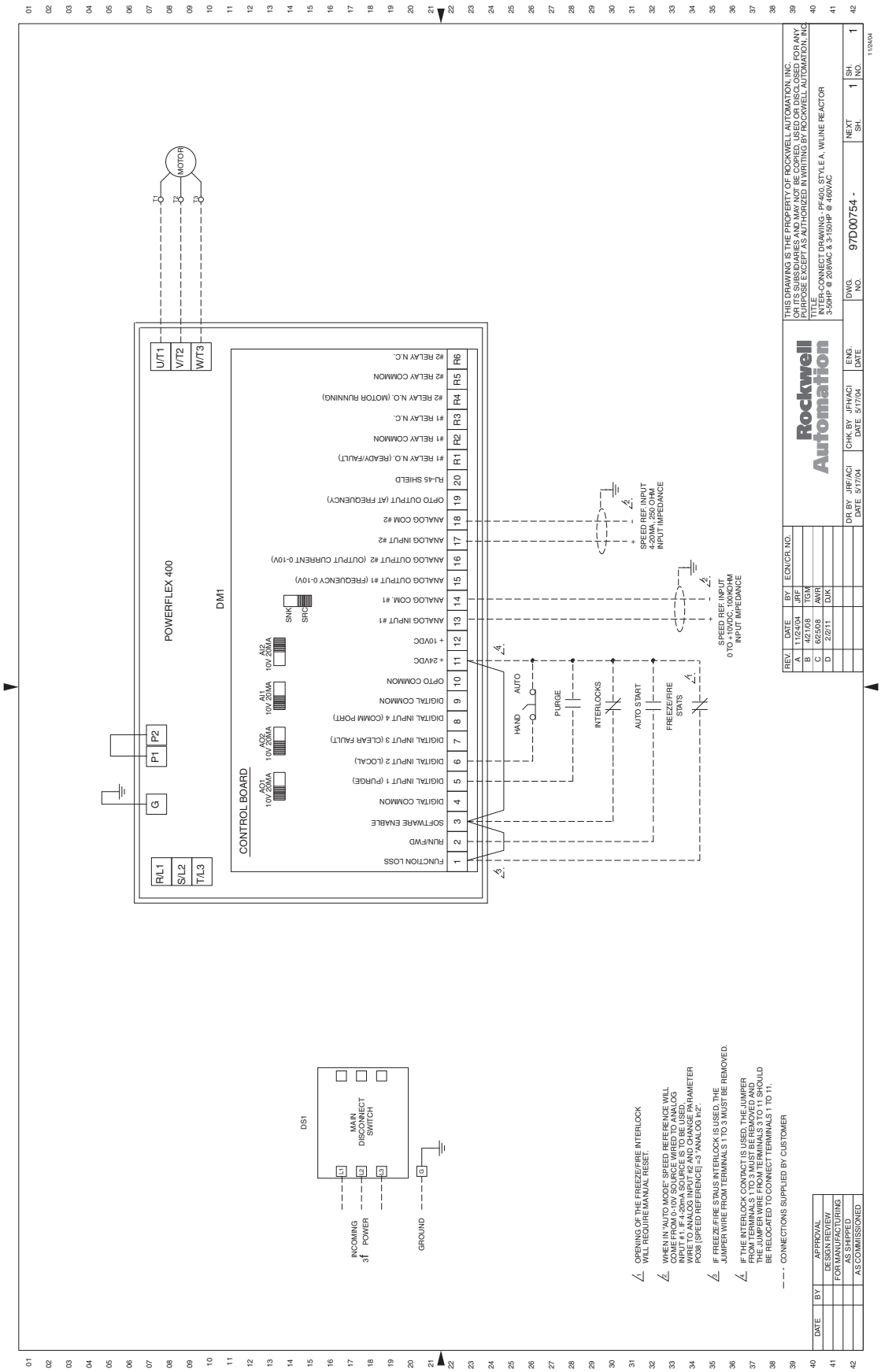


Figure 10 - 200 Hp, 460V AC Drives - NEMA/UL Type 1

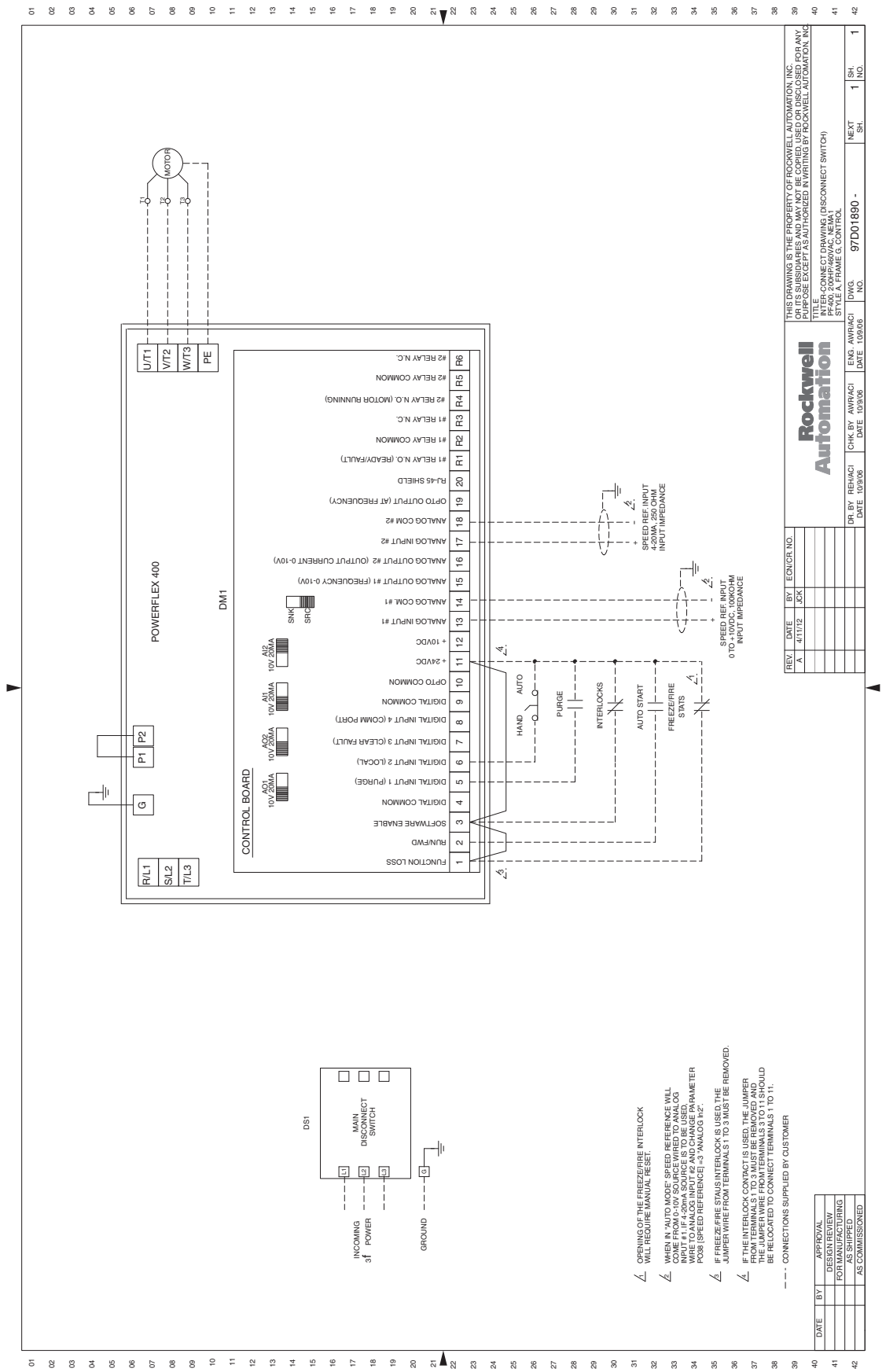


Figure 11 - 250…350 Hp, 460V AC Drives - NEMA/UL Type 1

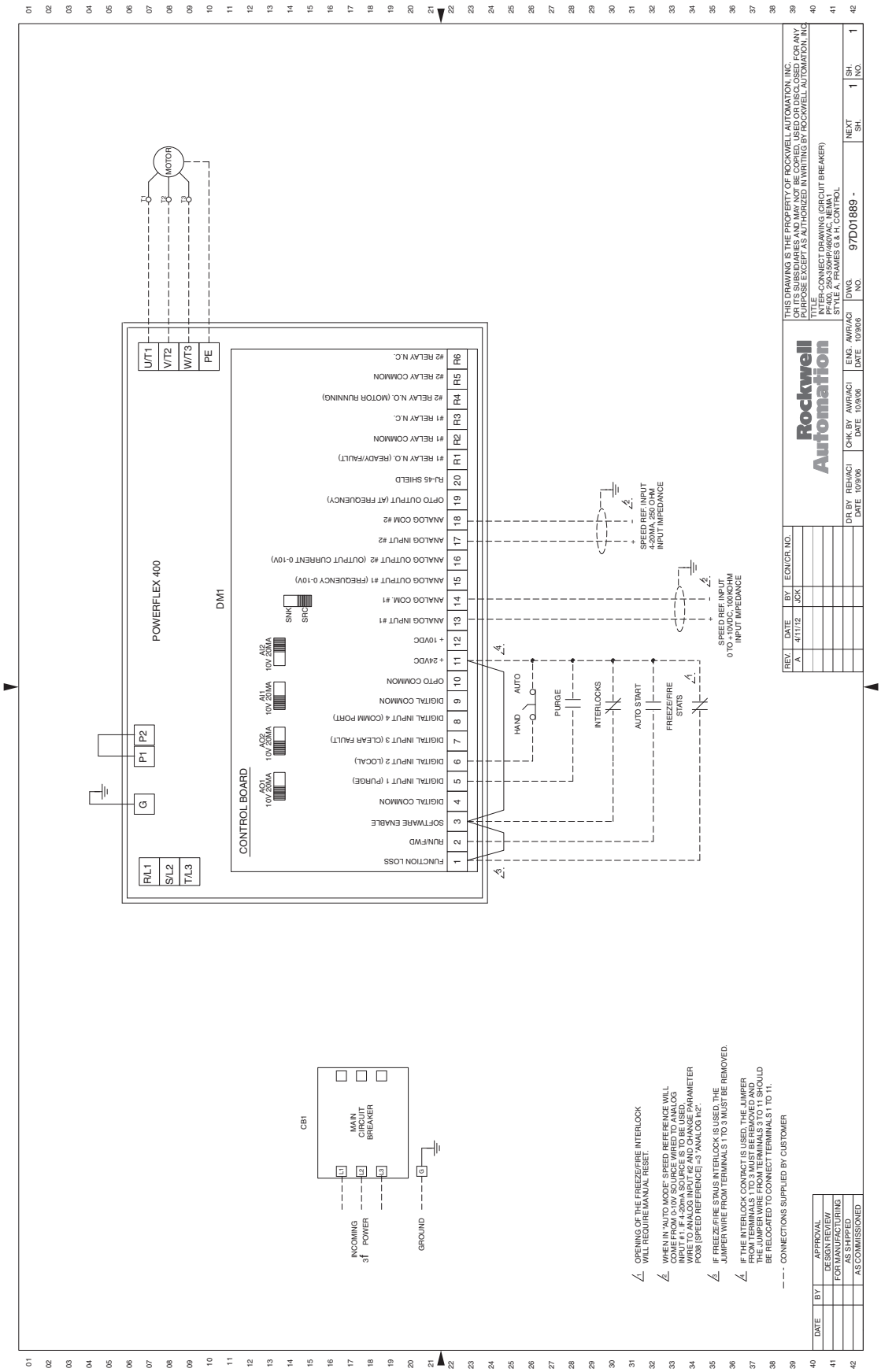
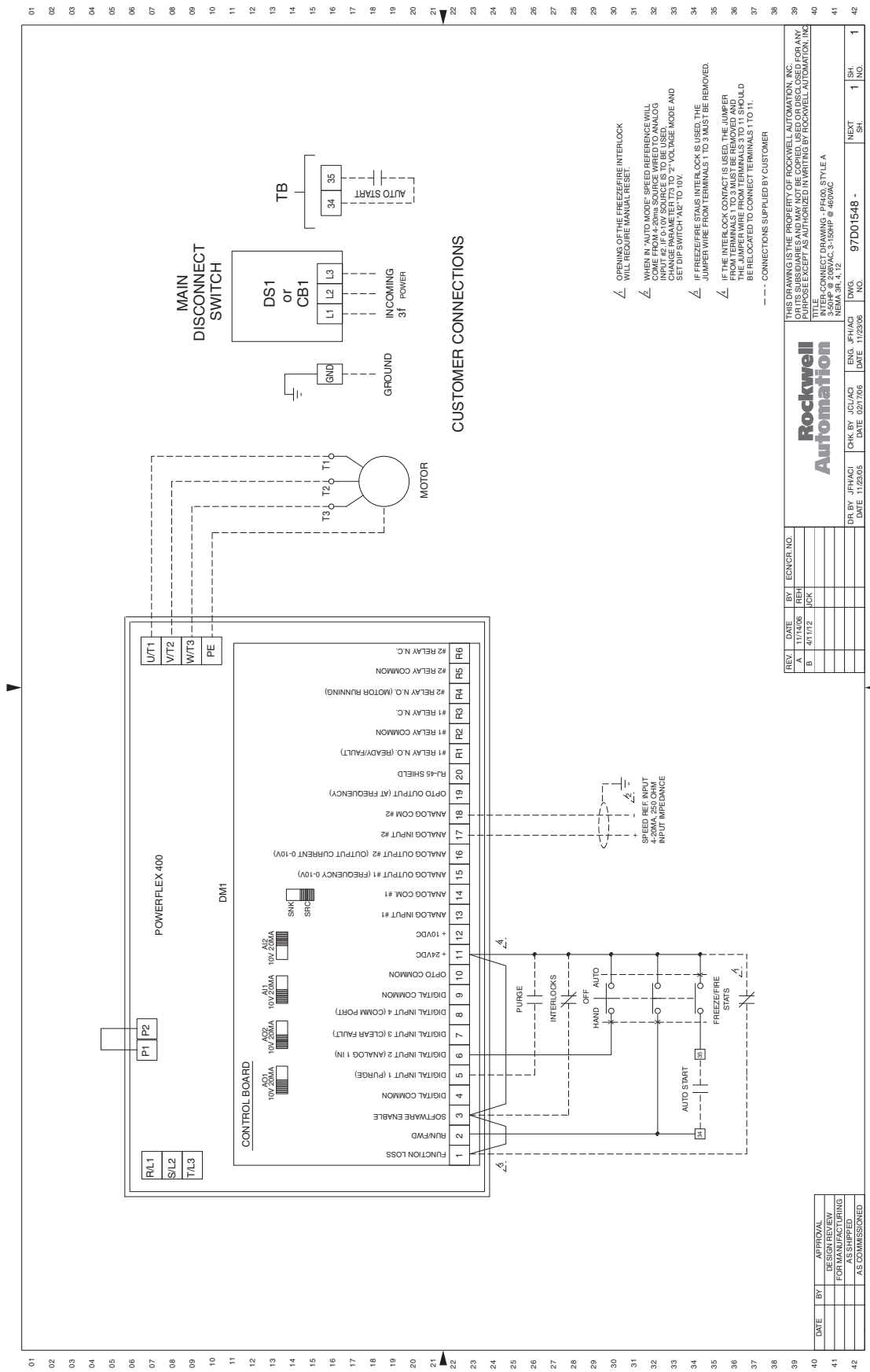


Figure 12 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12, 4, and 3R



Layout Drawings

Figure 13 - 3.0…10 Hp, 208V AC and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 1

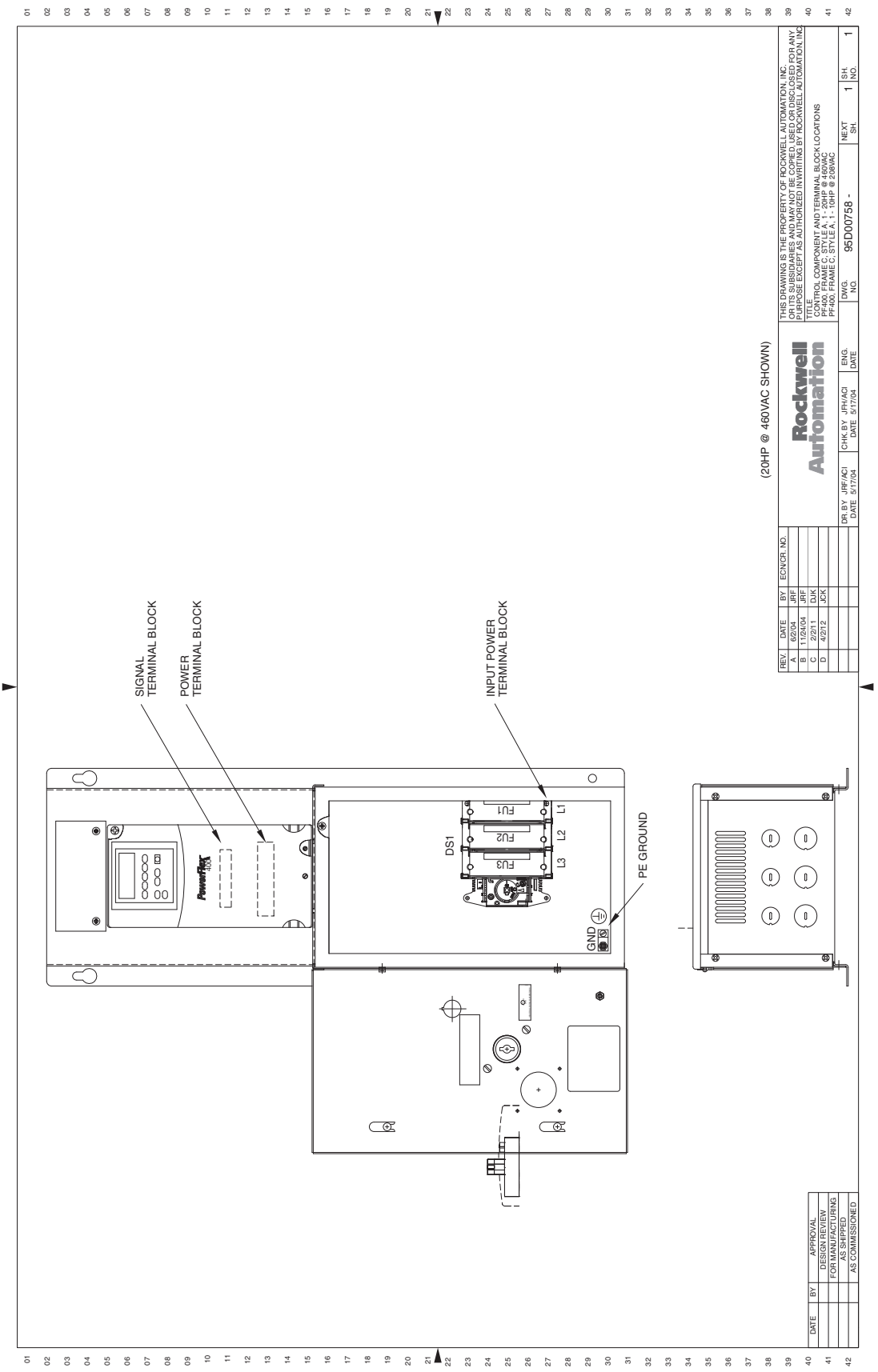


Figure 14 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 1

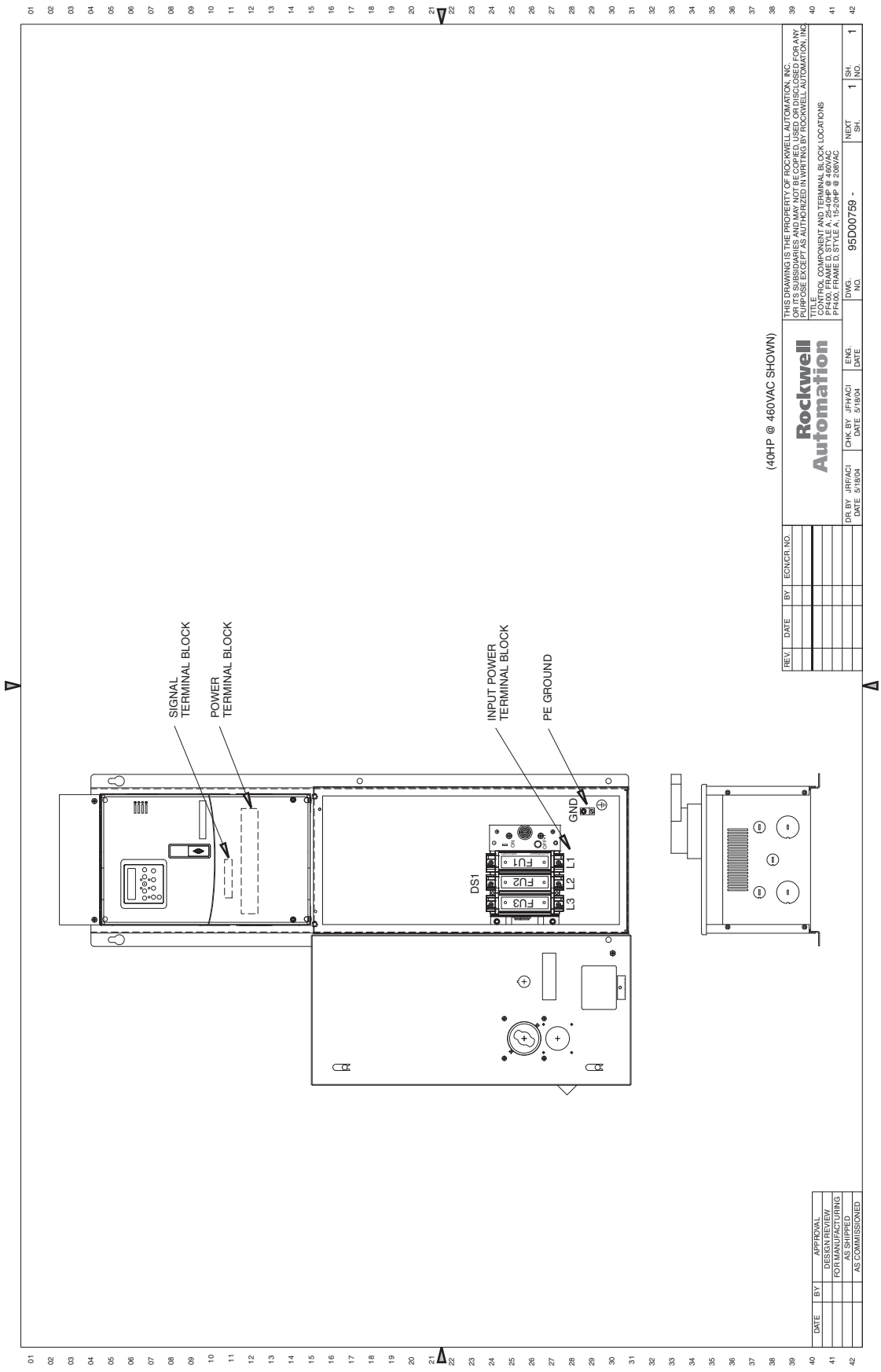


Figure 15 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 1

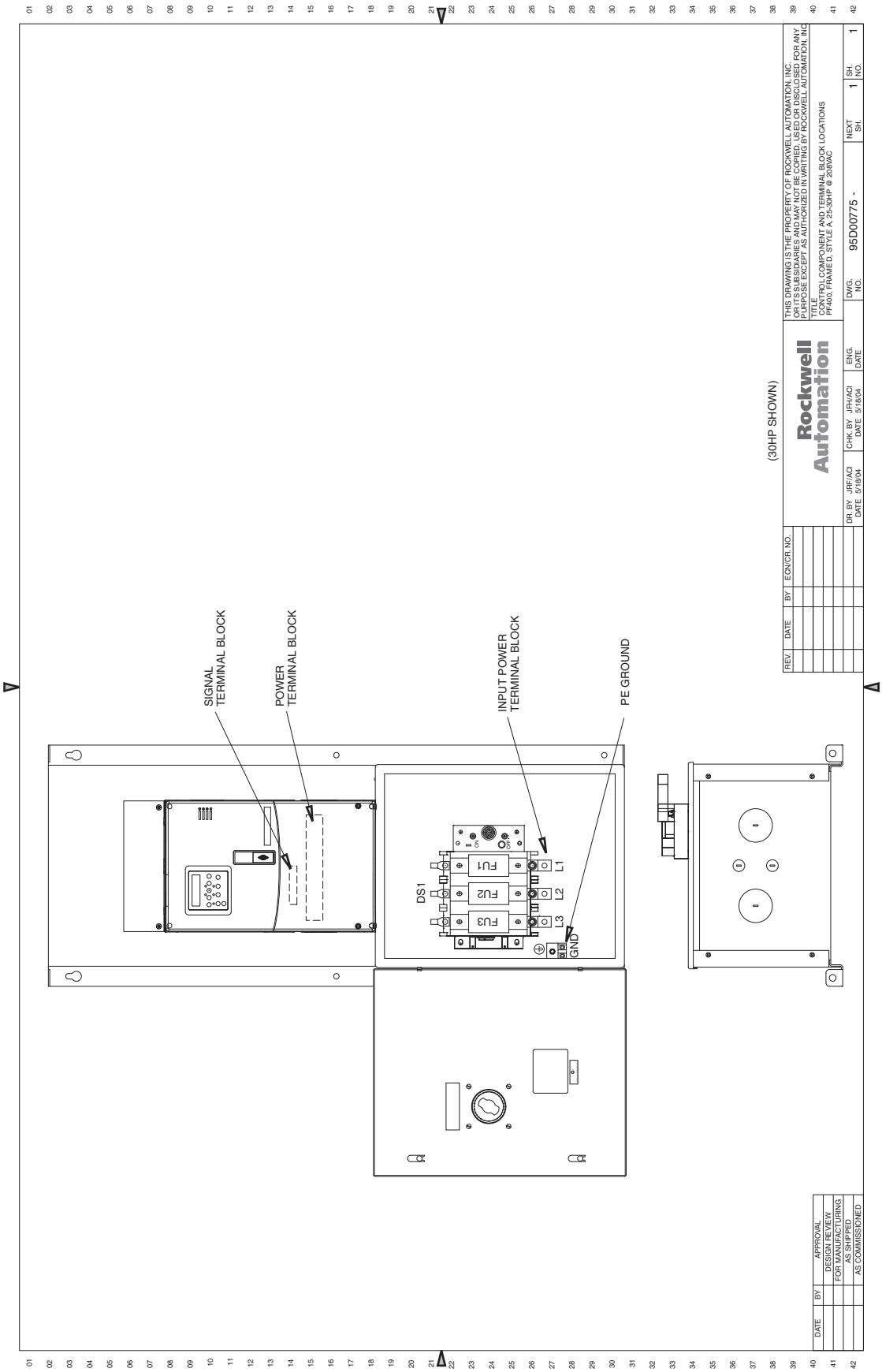


Figure 16 - 40 Hp, 208V AC and 50…100 Hp, 460V AC Drives - NEMA/UL Type 1

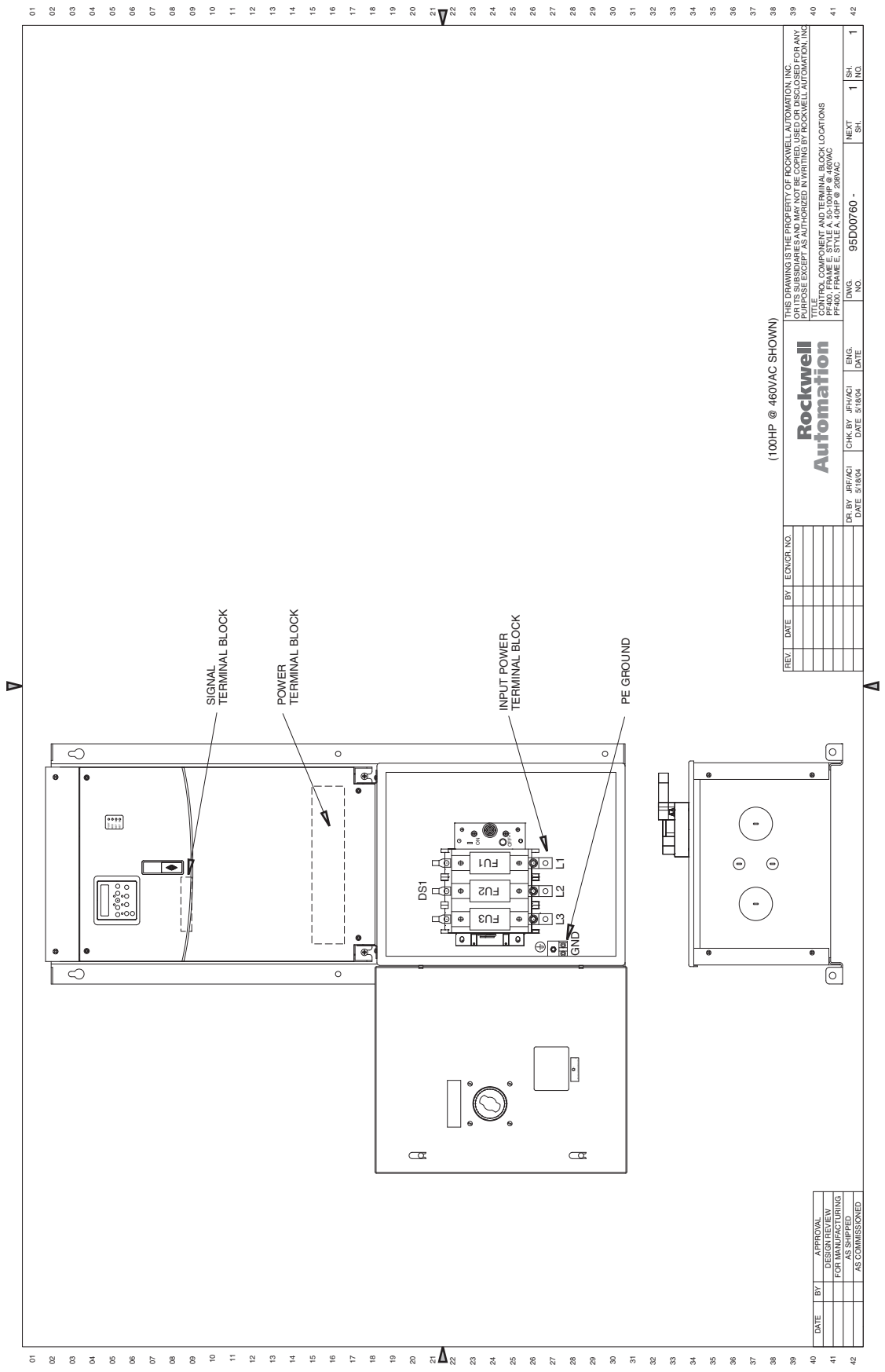


Figure 17 - 50 Hp, 208V AC Drives - NEMA/UL Type 1

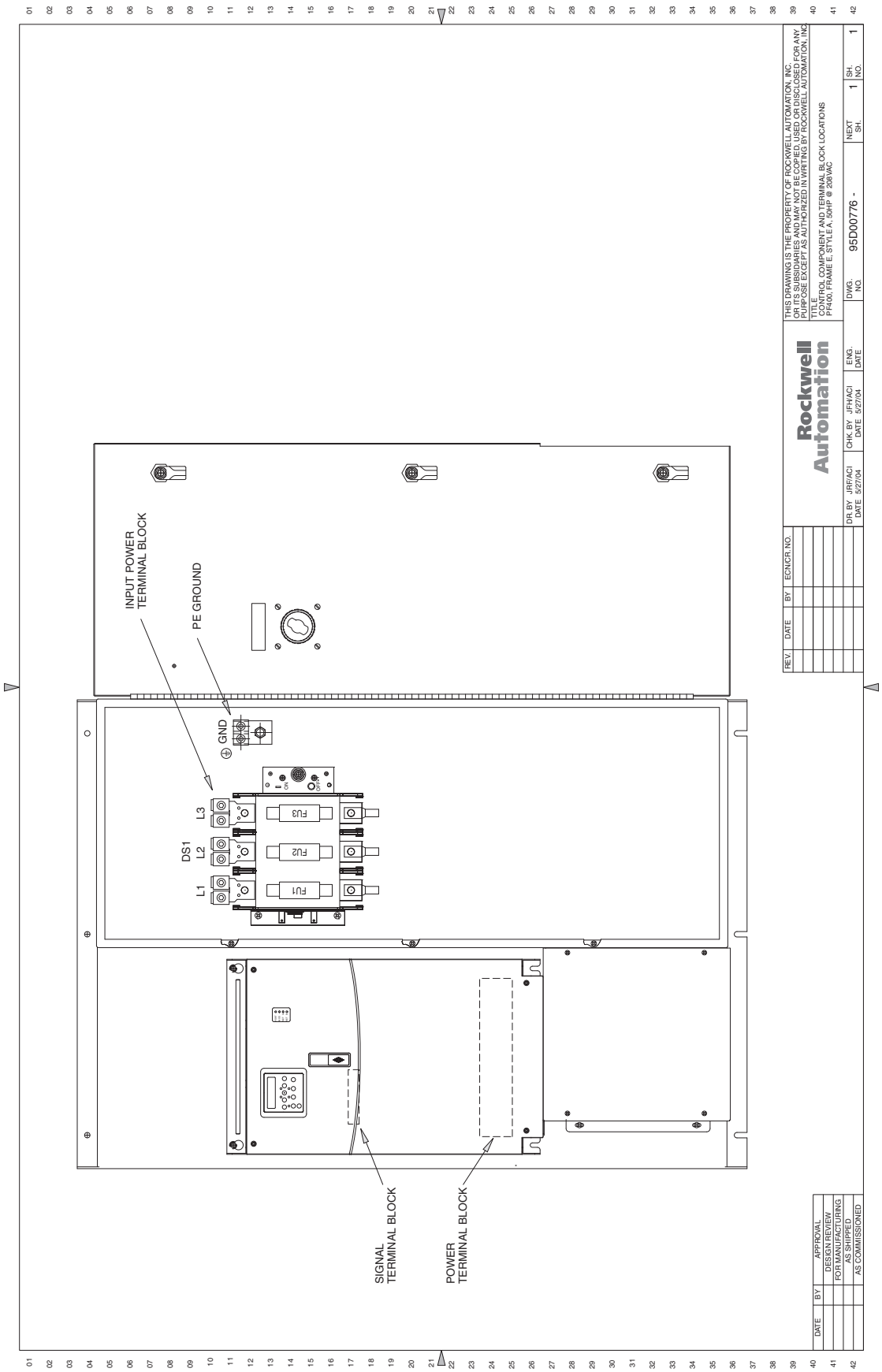


Figure 18 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 1

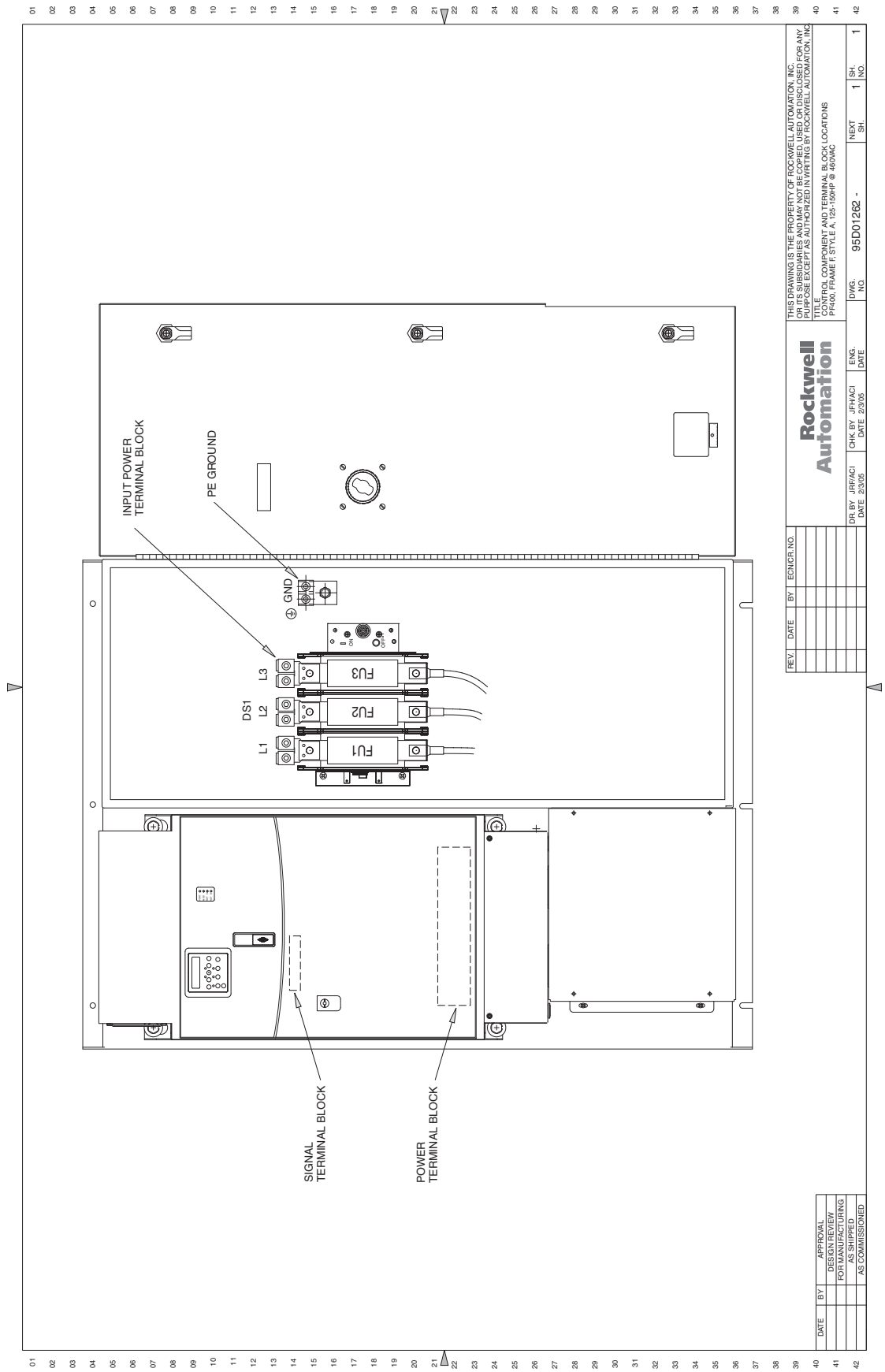


Figure 19 - 200…250 Hp, 460V AC Drives - NEMA/UL Type 1

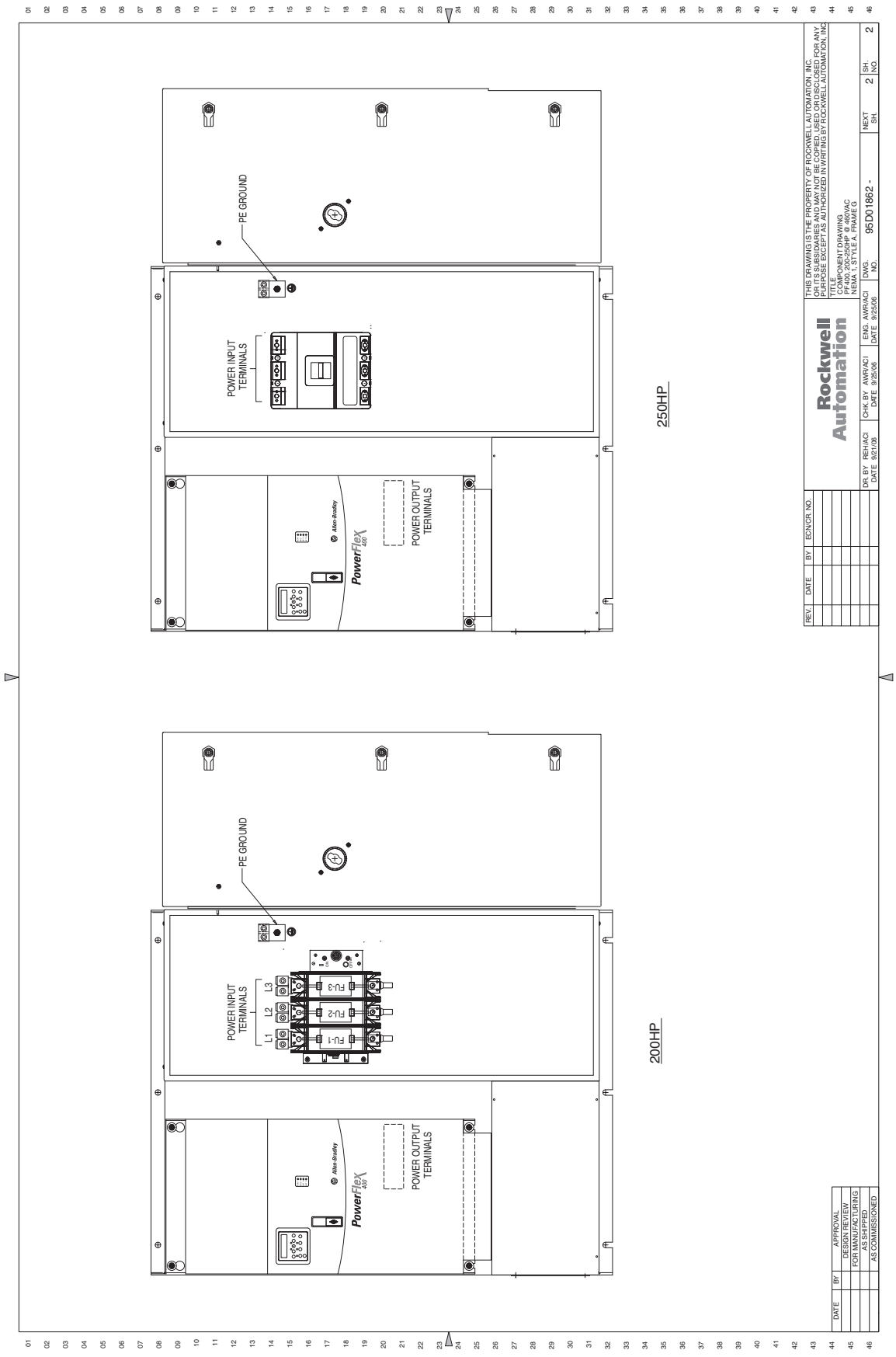


Figure 20 - 300…350 Hp, 460V AC Drives - NEMA/UL Type 1

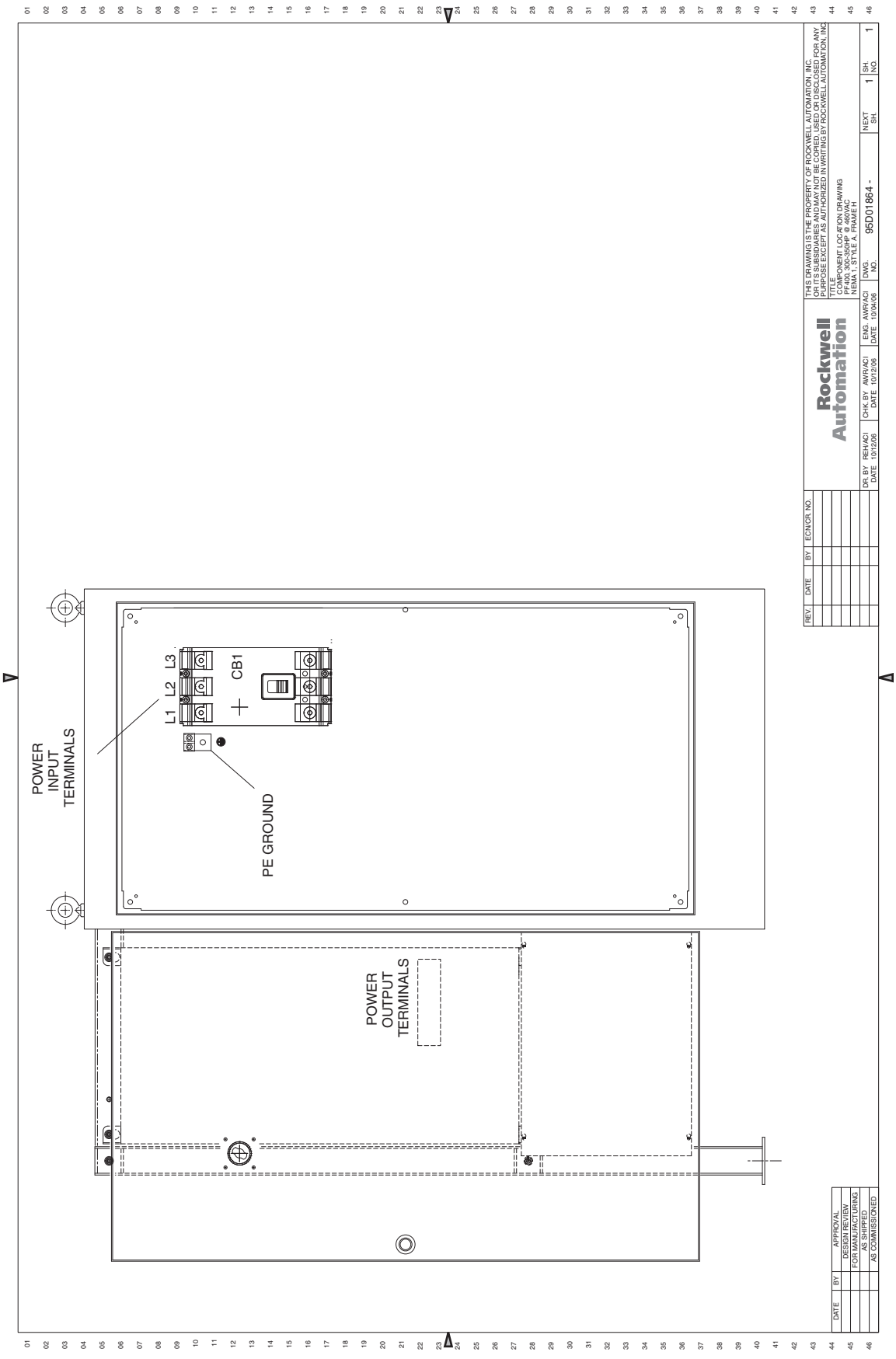


Figure 21 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

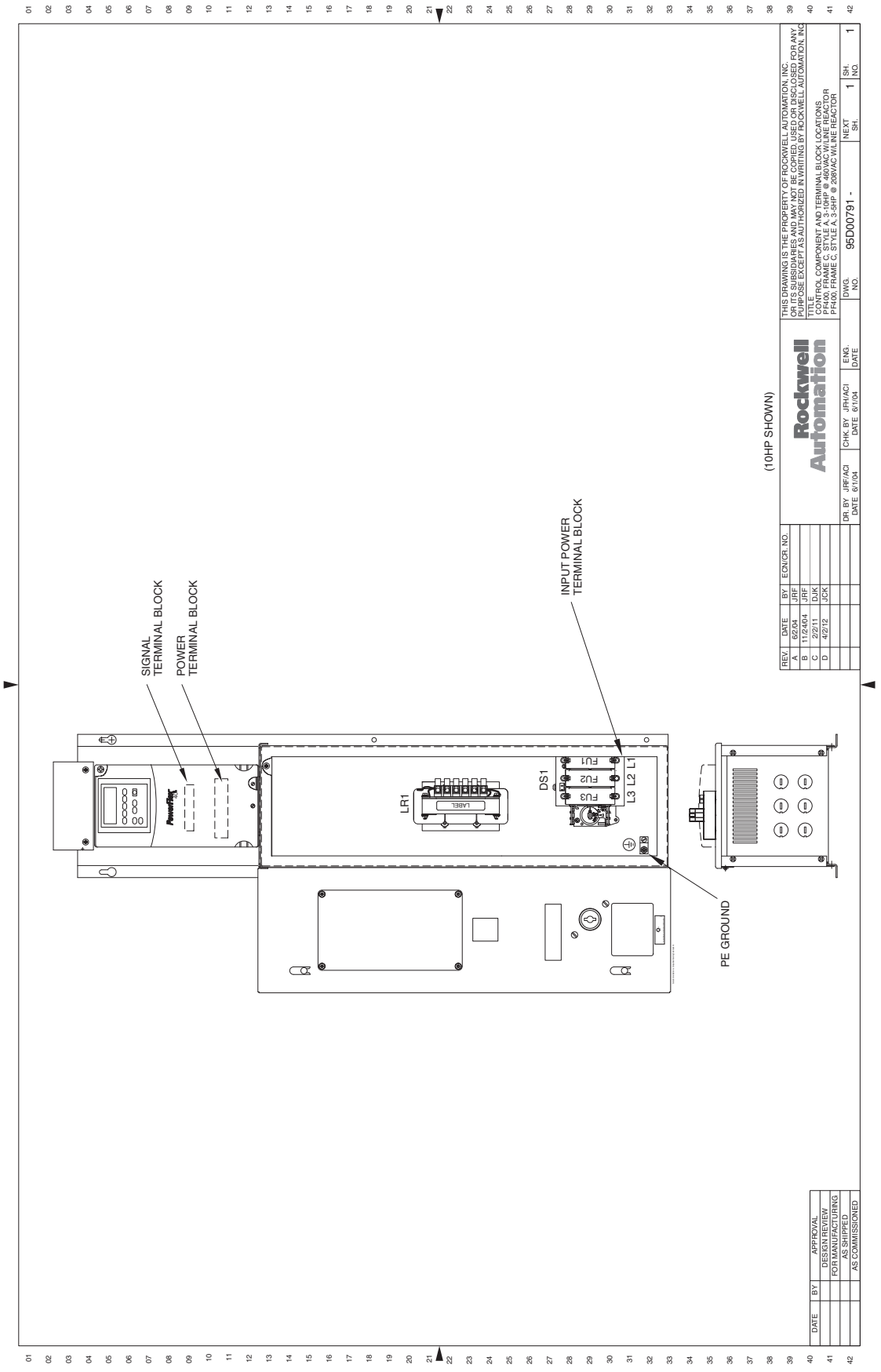


Figure 22 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

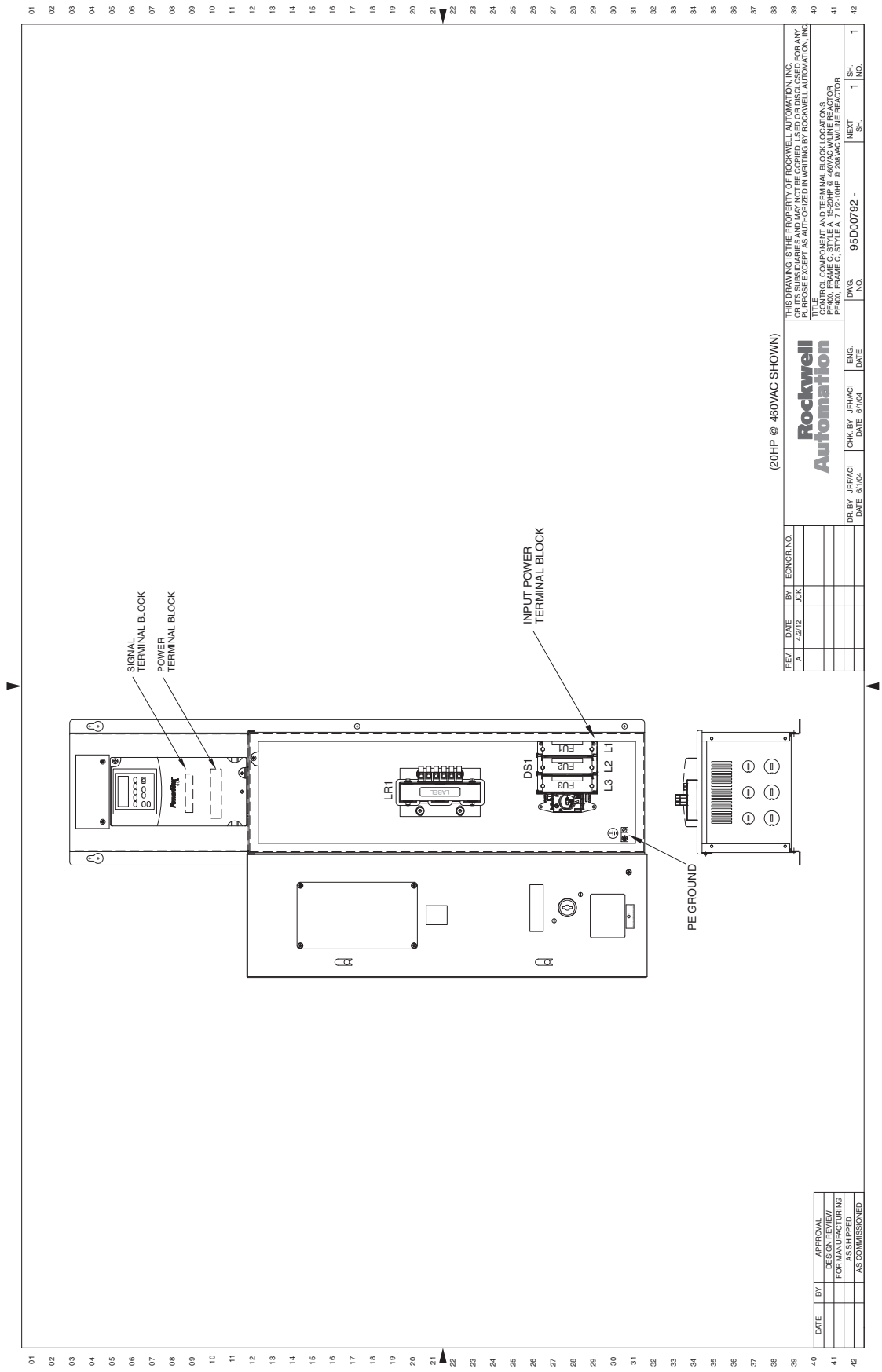


Figure 23 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

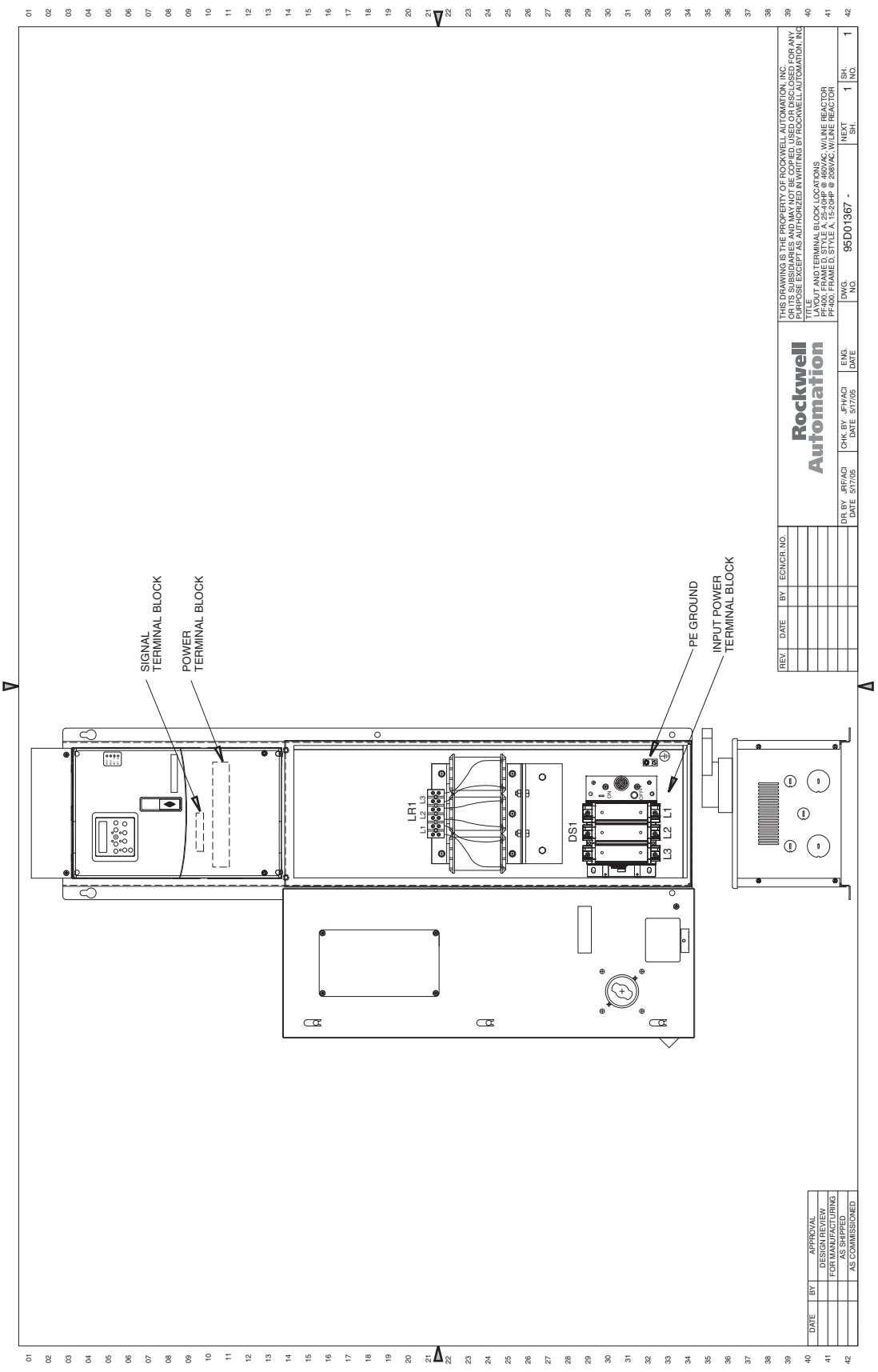


Figure 24 - 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1

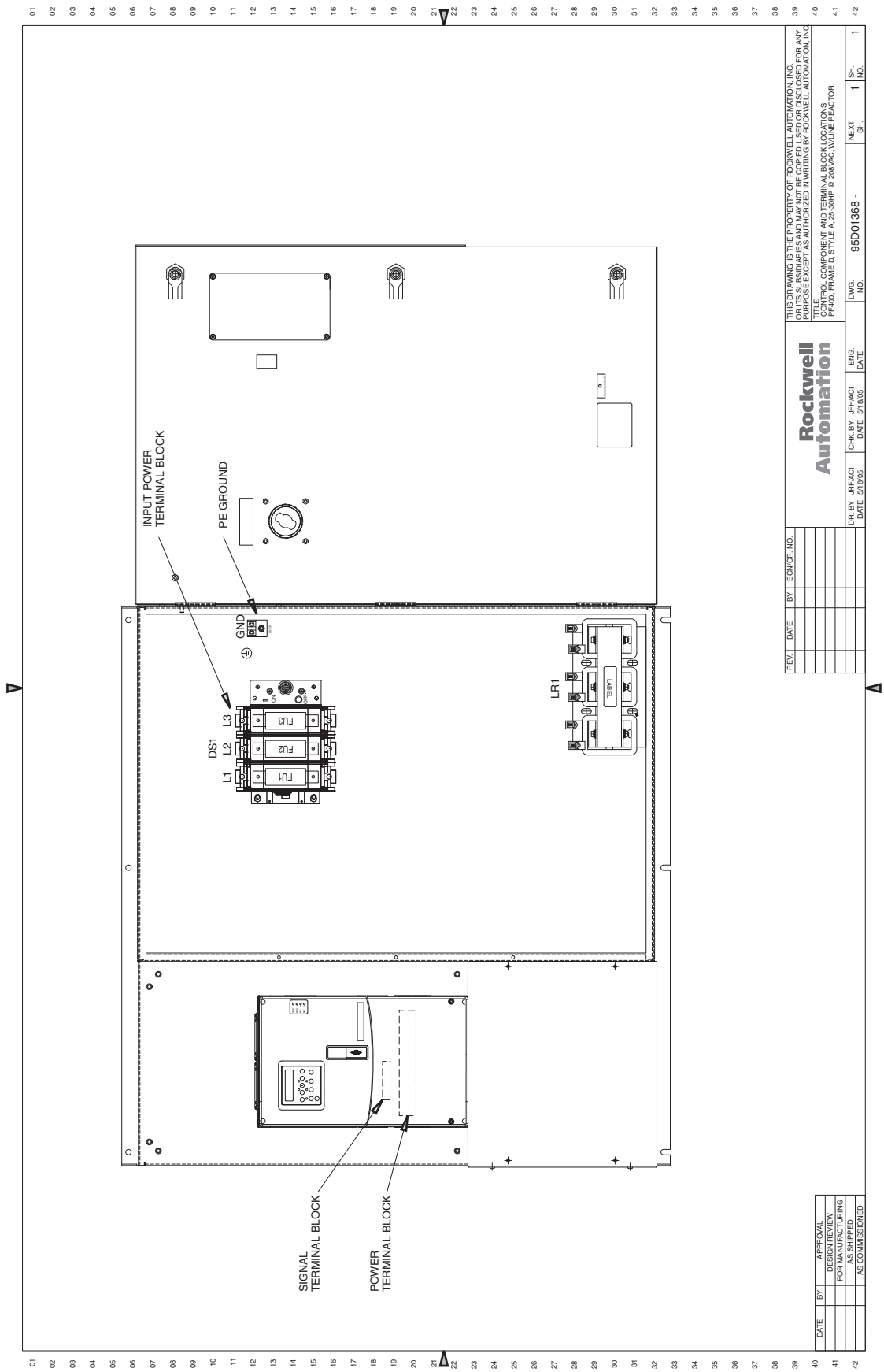


Figure 25 - 40…50 Hp, 208V AC and 50…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

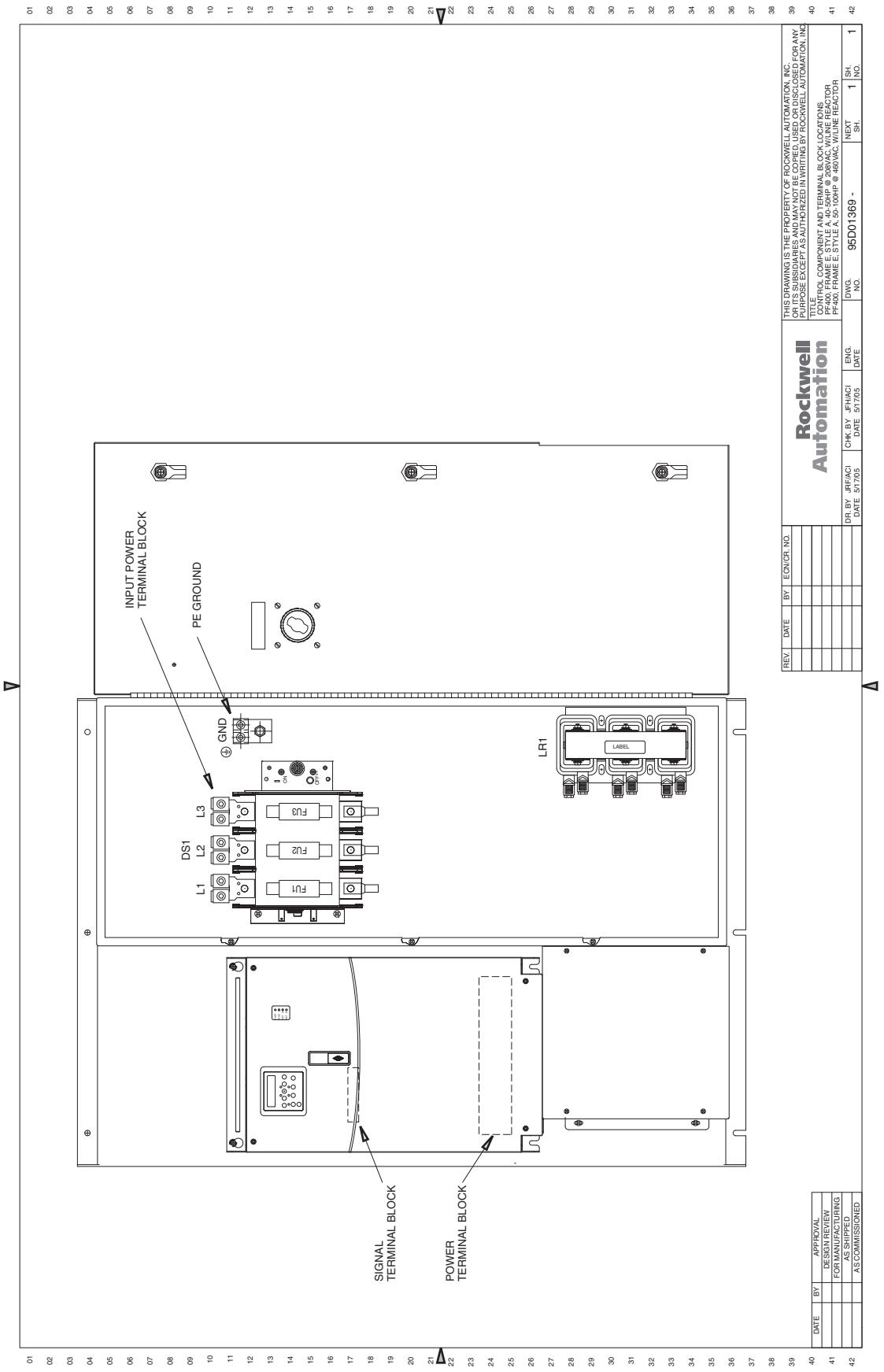


Figure 26 - 125…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

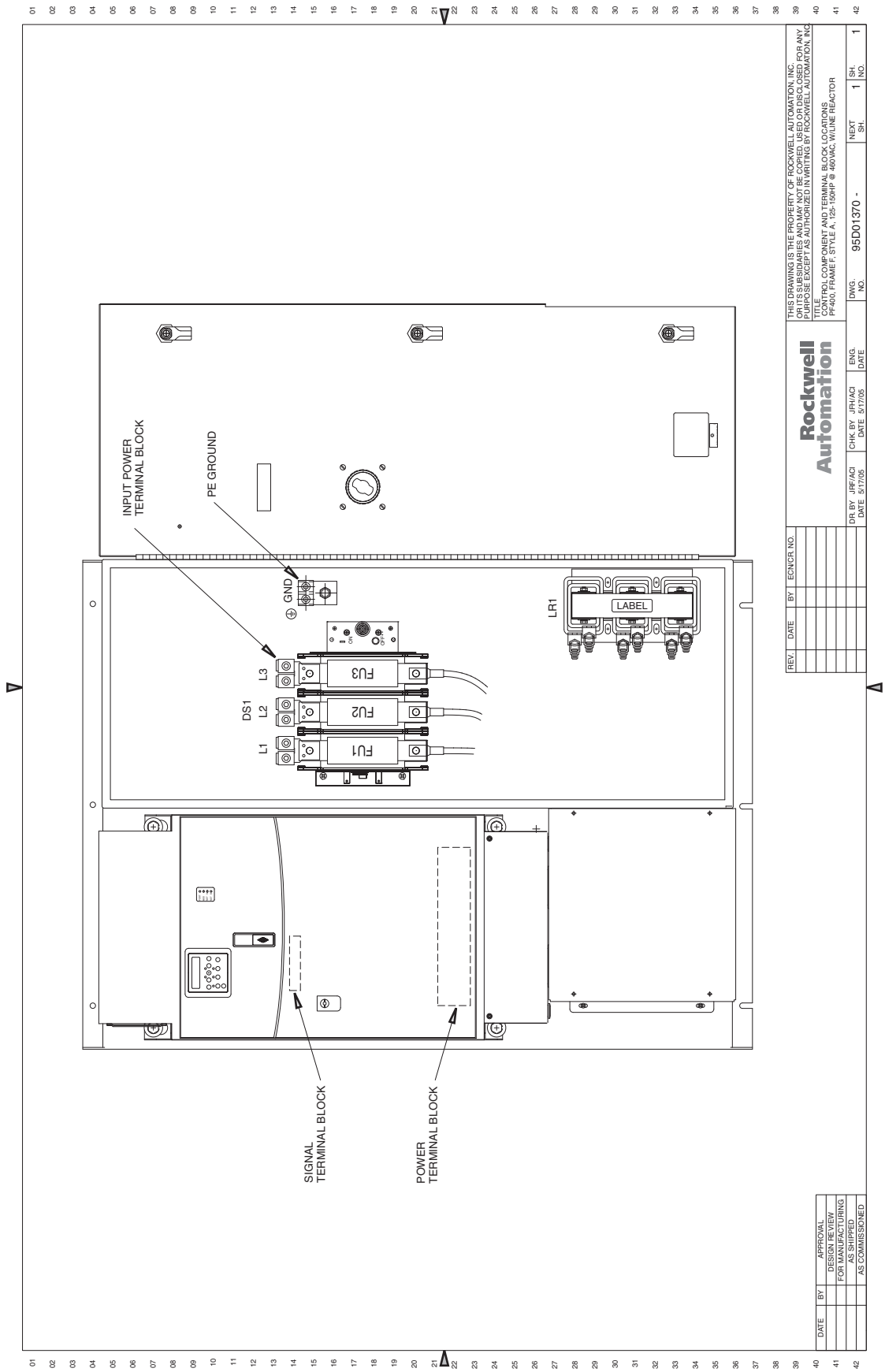


Figure 27 - 3.0…10 Hp, 208V and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 12

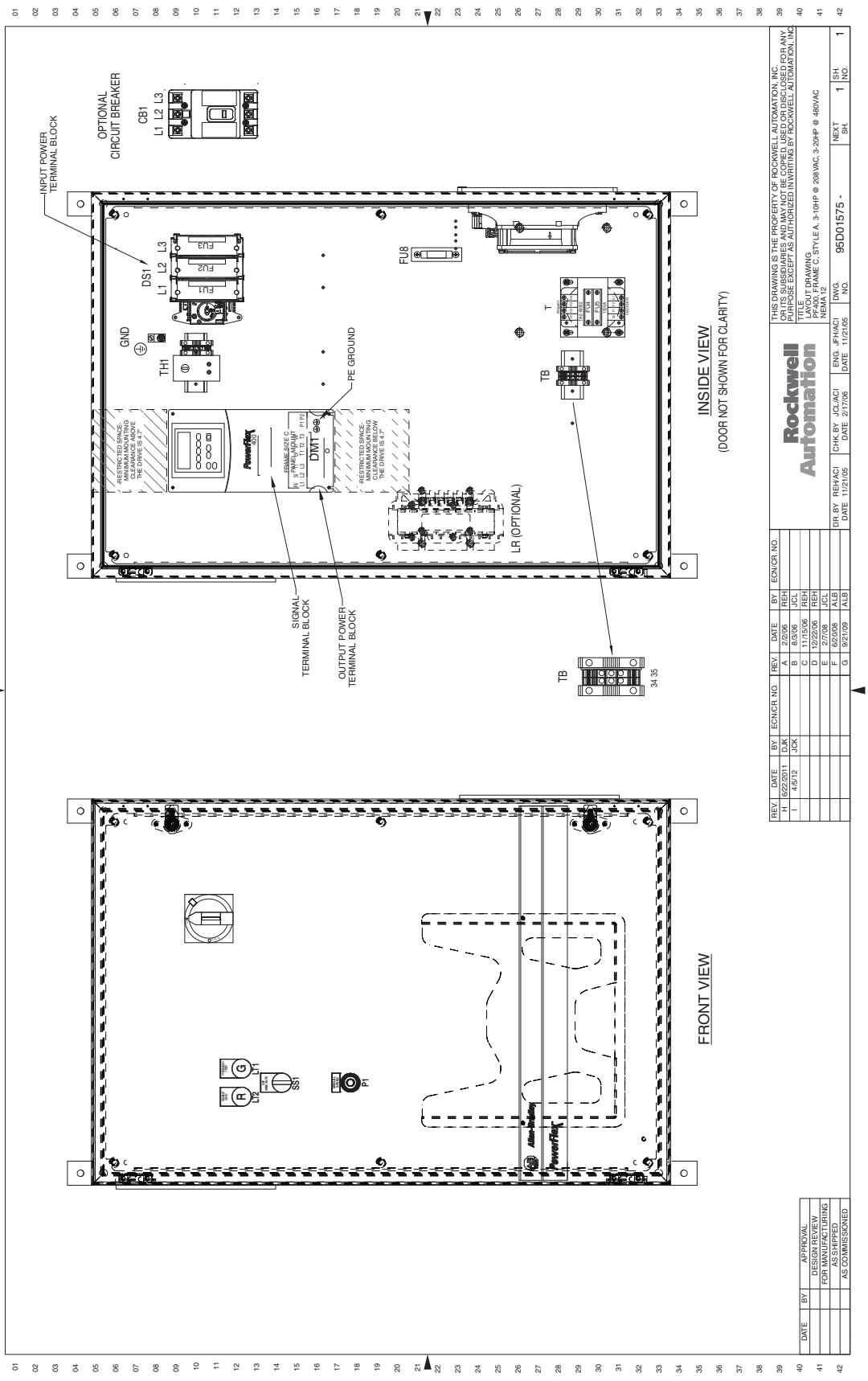


Figure 28 - 15…20 Hp, 208V AC and 25…40 Hp 460V AC Drives - NEMA/UL Type 12

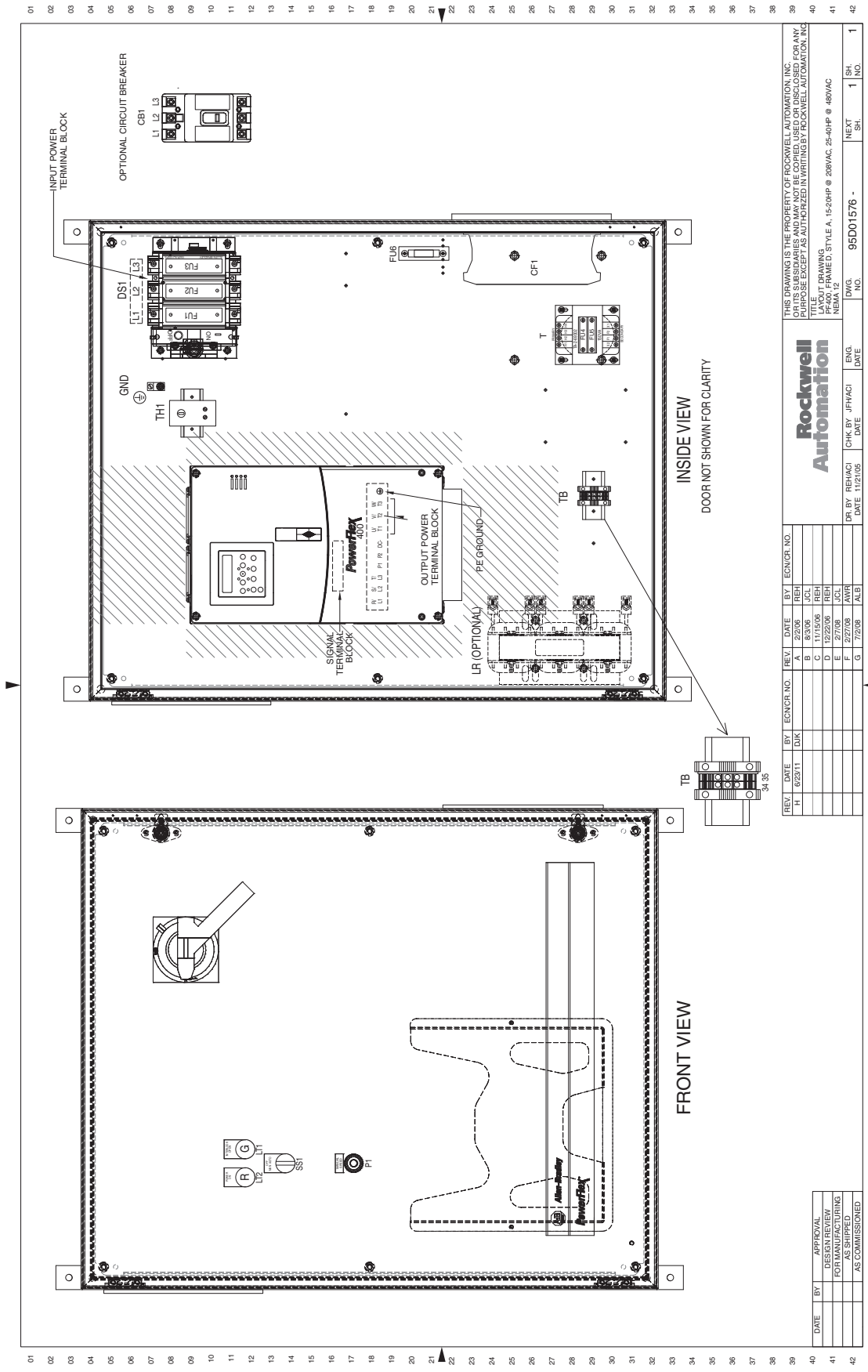


Figure 29 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 12

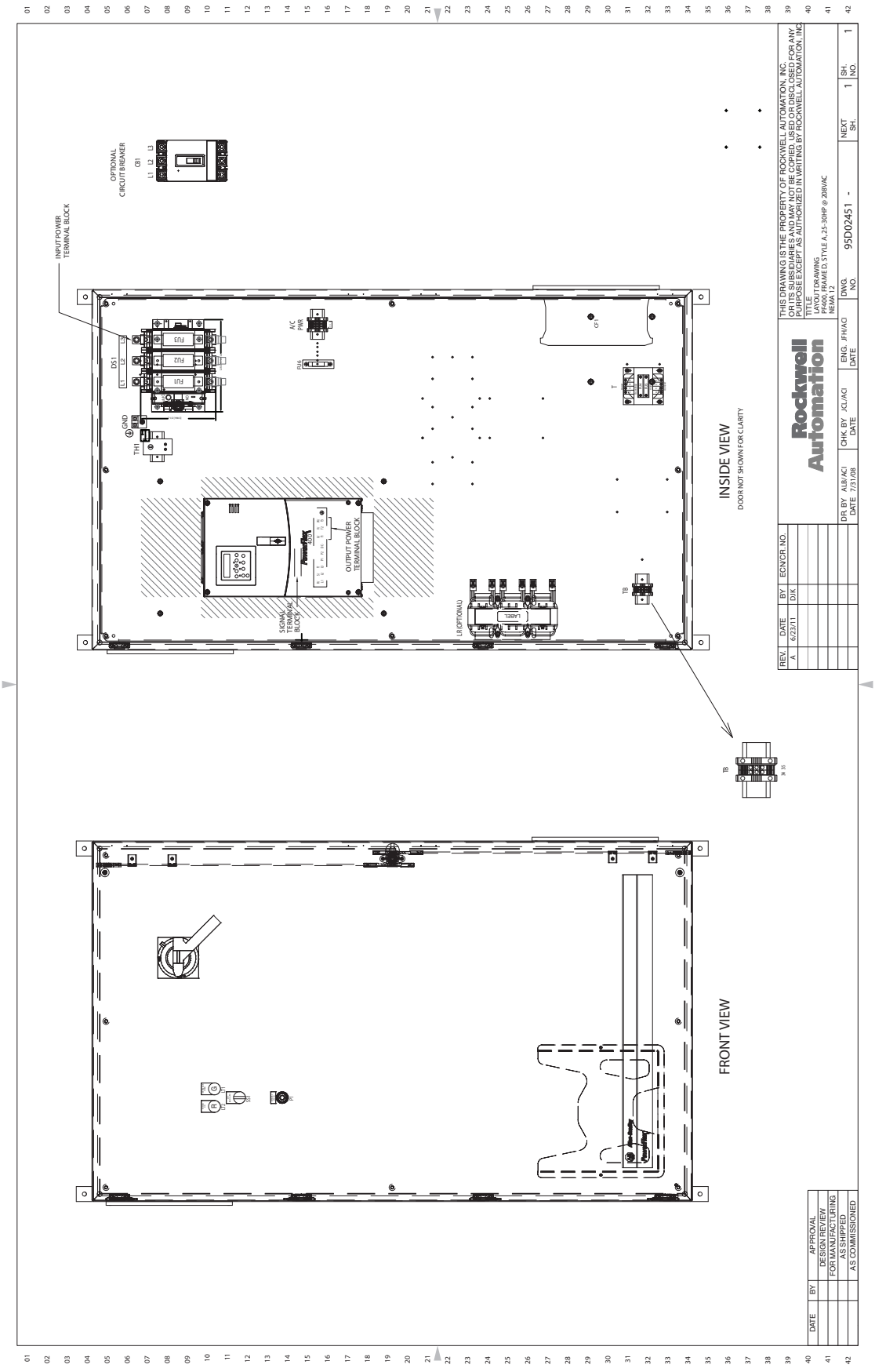


Figure 30 - 40…50 Hp, 208V AC Drives - NEMA/UL Type 12

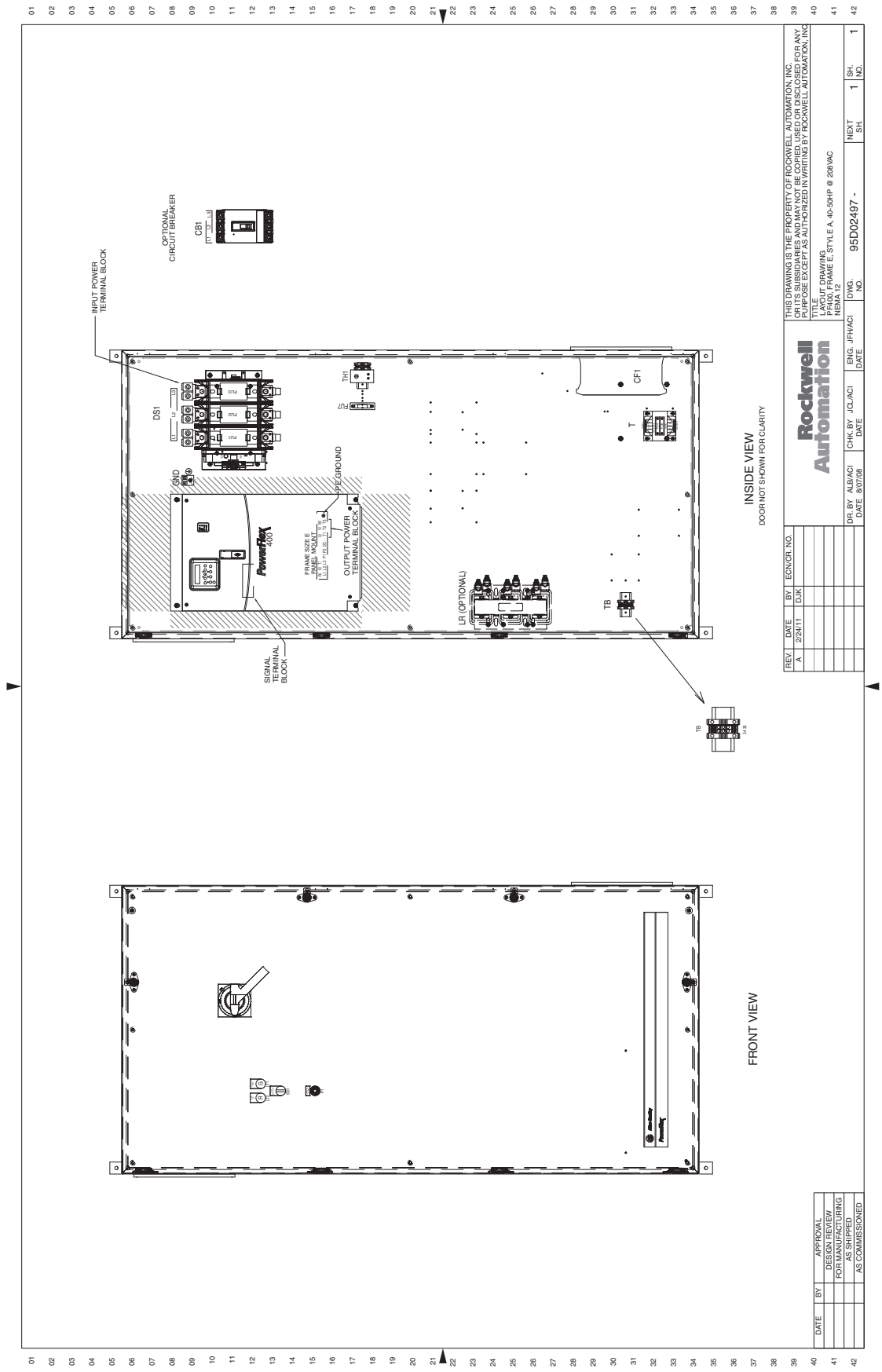


Figure 31 - 50…60 Hp, 460V AC Drives - NEMA/UL Type 12

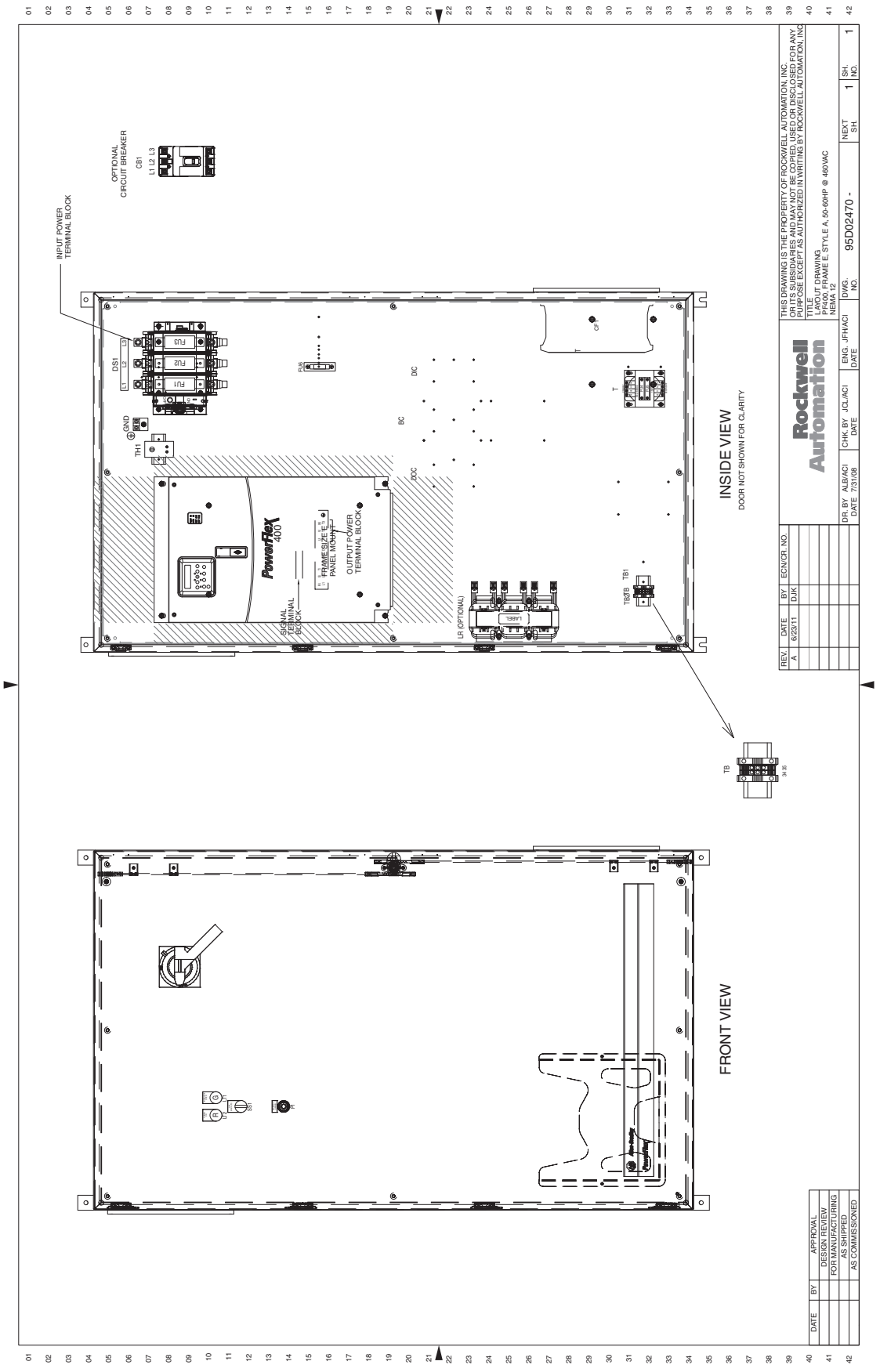


Figure 32 - 75…100 Hp, 460V AC Drives - NEMA/UL Type 12

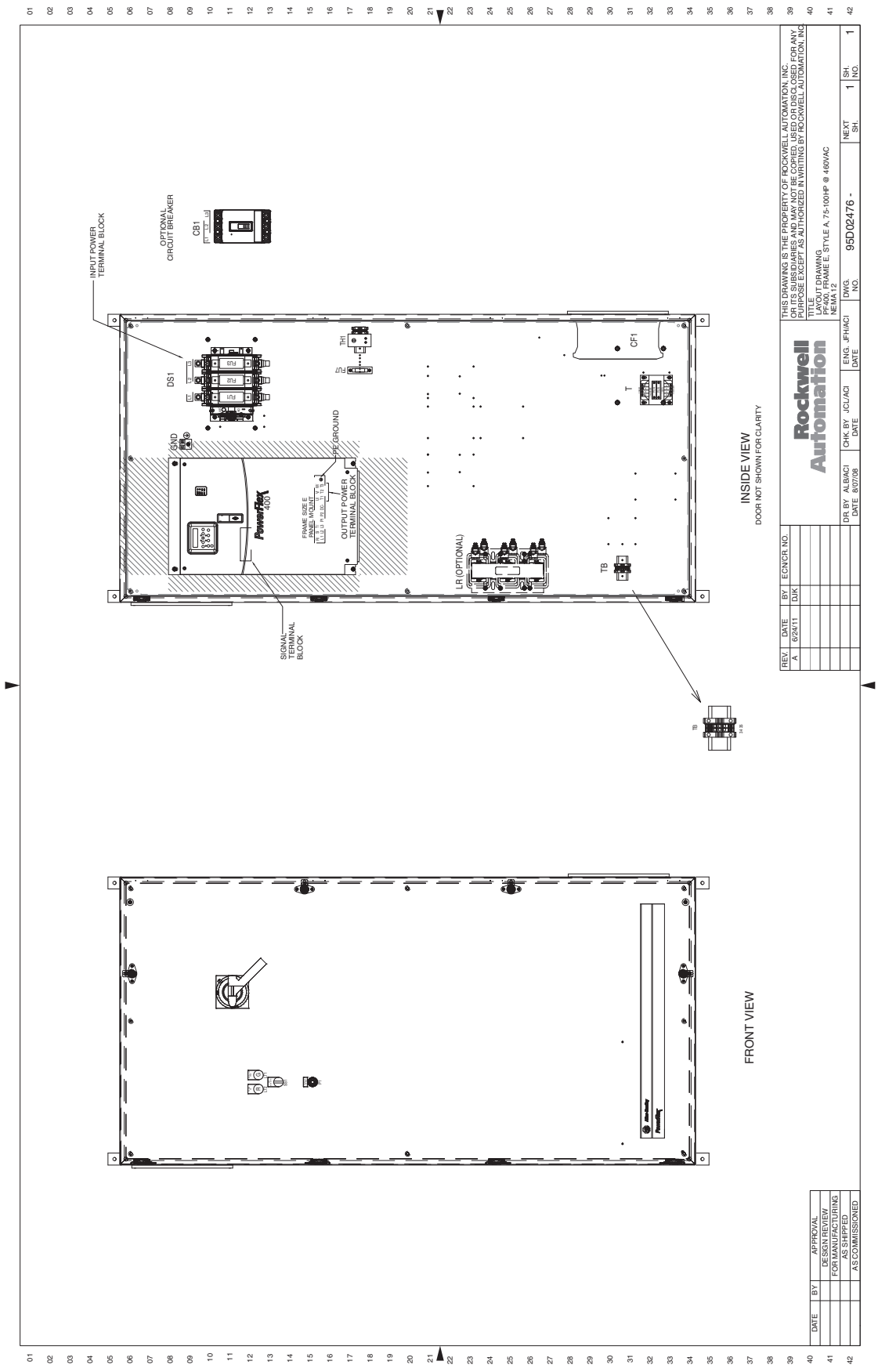


Figure 33 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 12

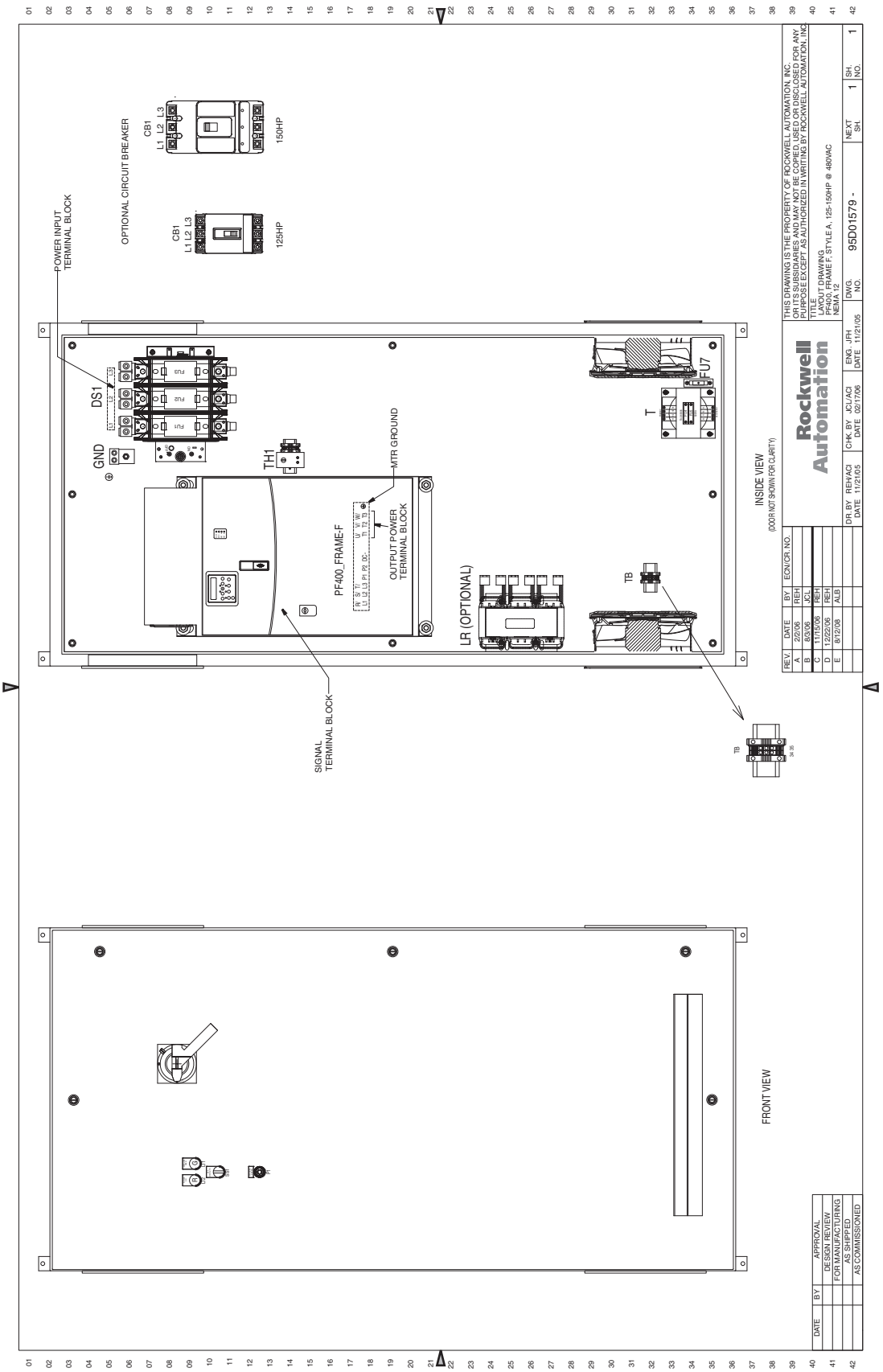


Figure 34 - 3.0…5.0 Hp, 460V AC Drives - NEMA/UL Type 4

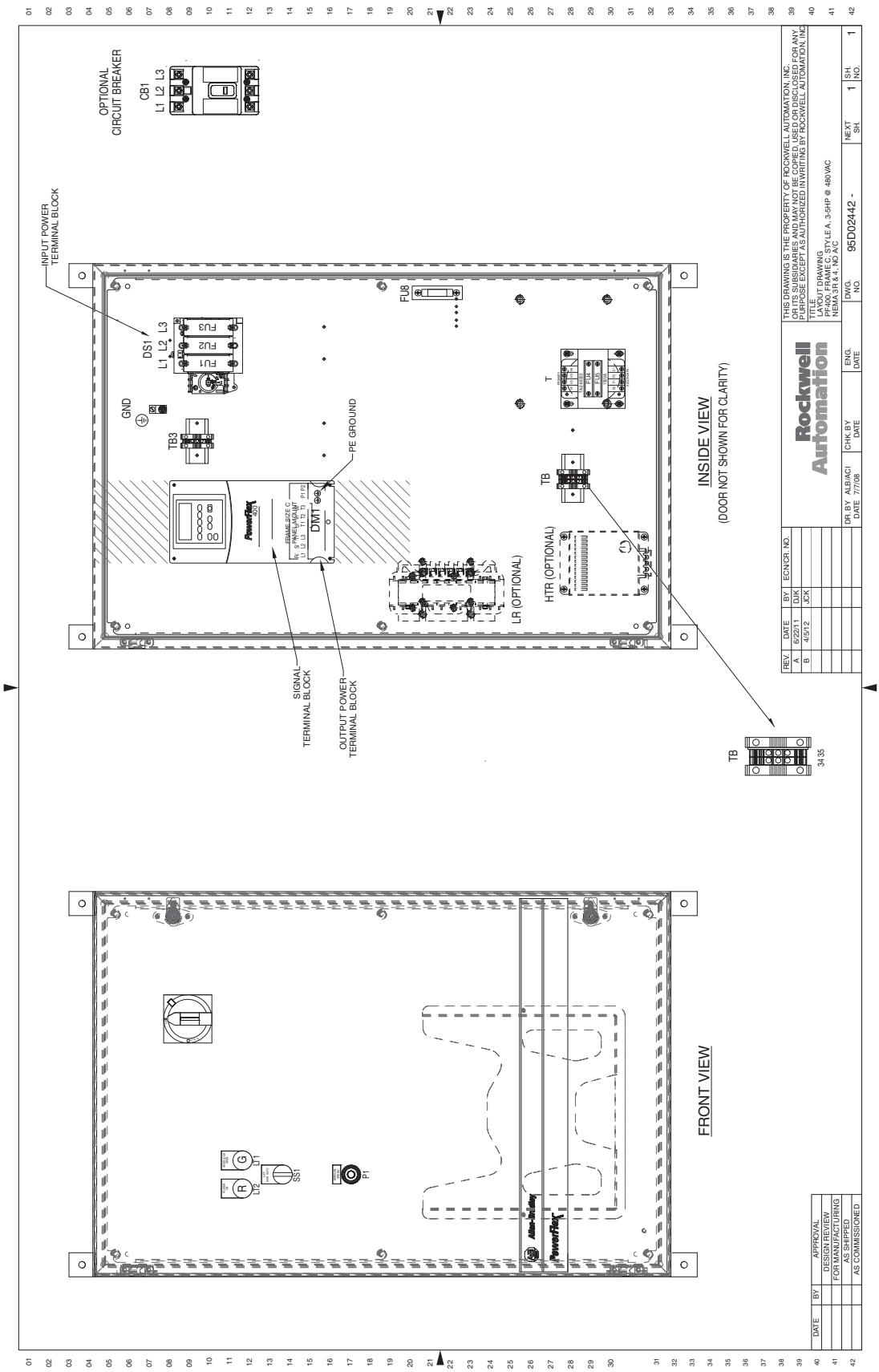


Figure 35 - 3.0…10 Hp, 208V AC and 7.5…20 Hp, 460V AC Drives - NEMA/UL Type 4

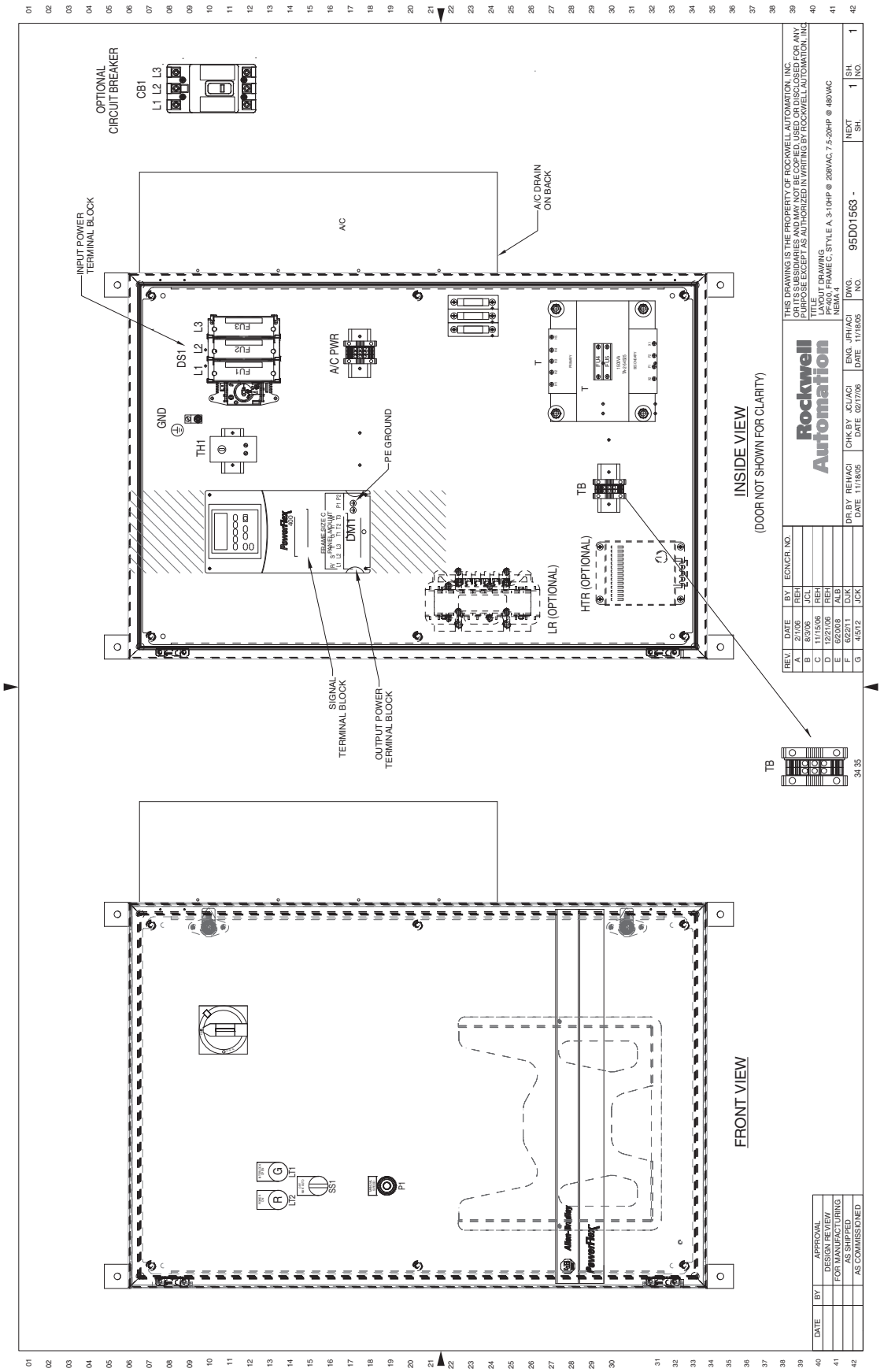


Figure 36 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 4

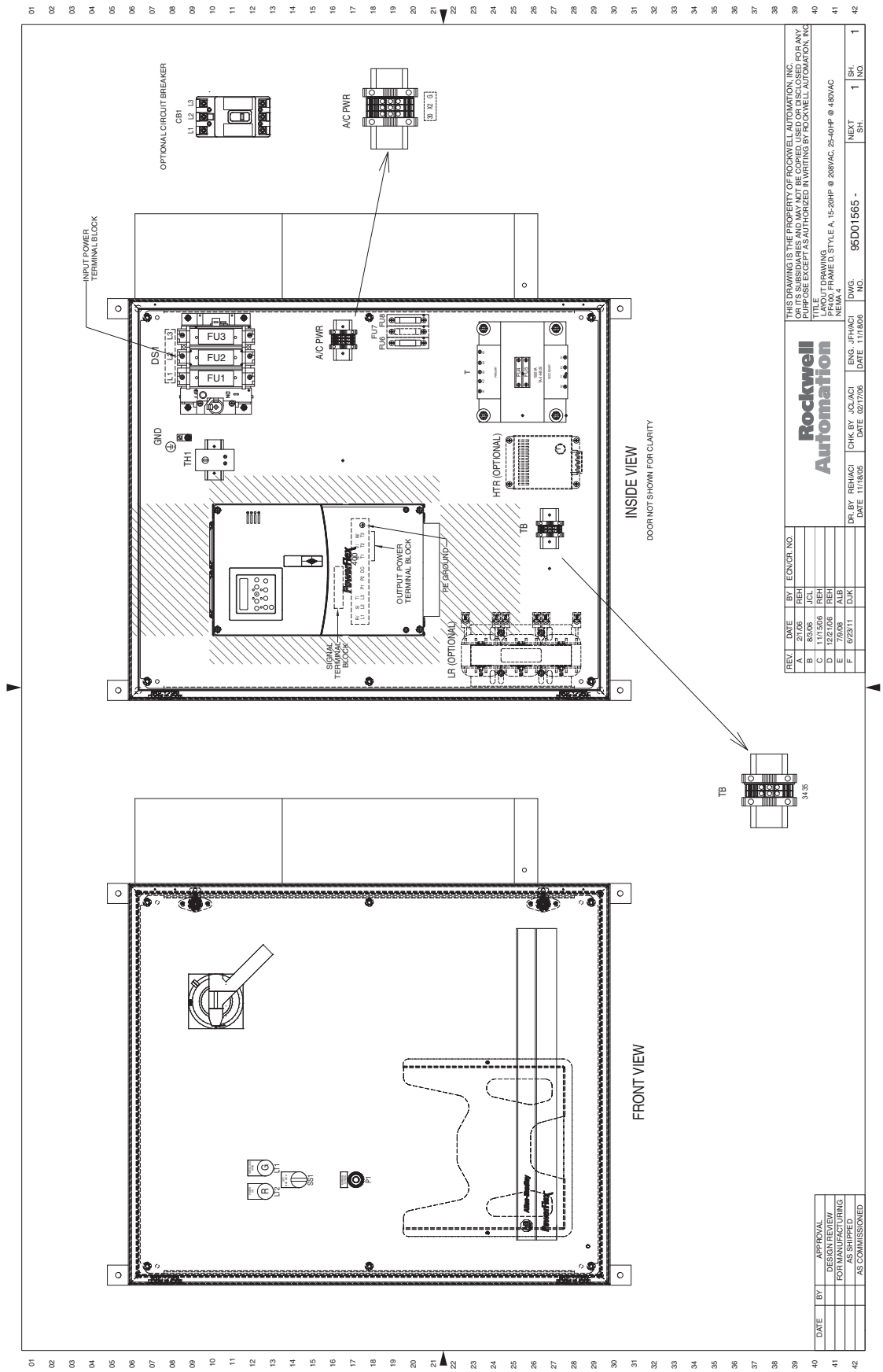


Figure 37 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 4

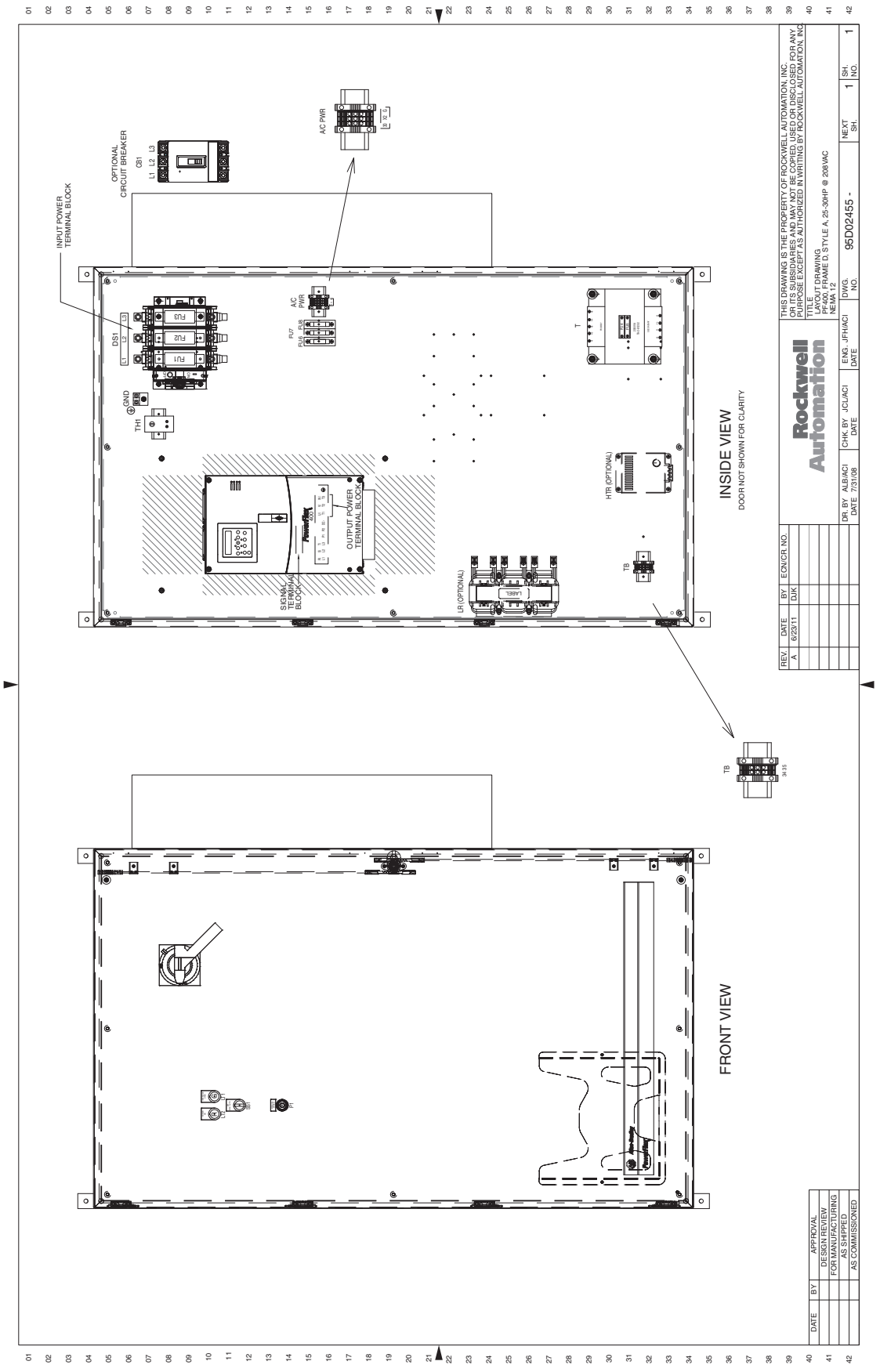


Figure 38 - 40…50 Hp, 208V AC Drives - NEMA/UL Type 4

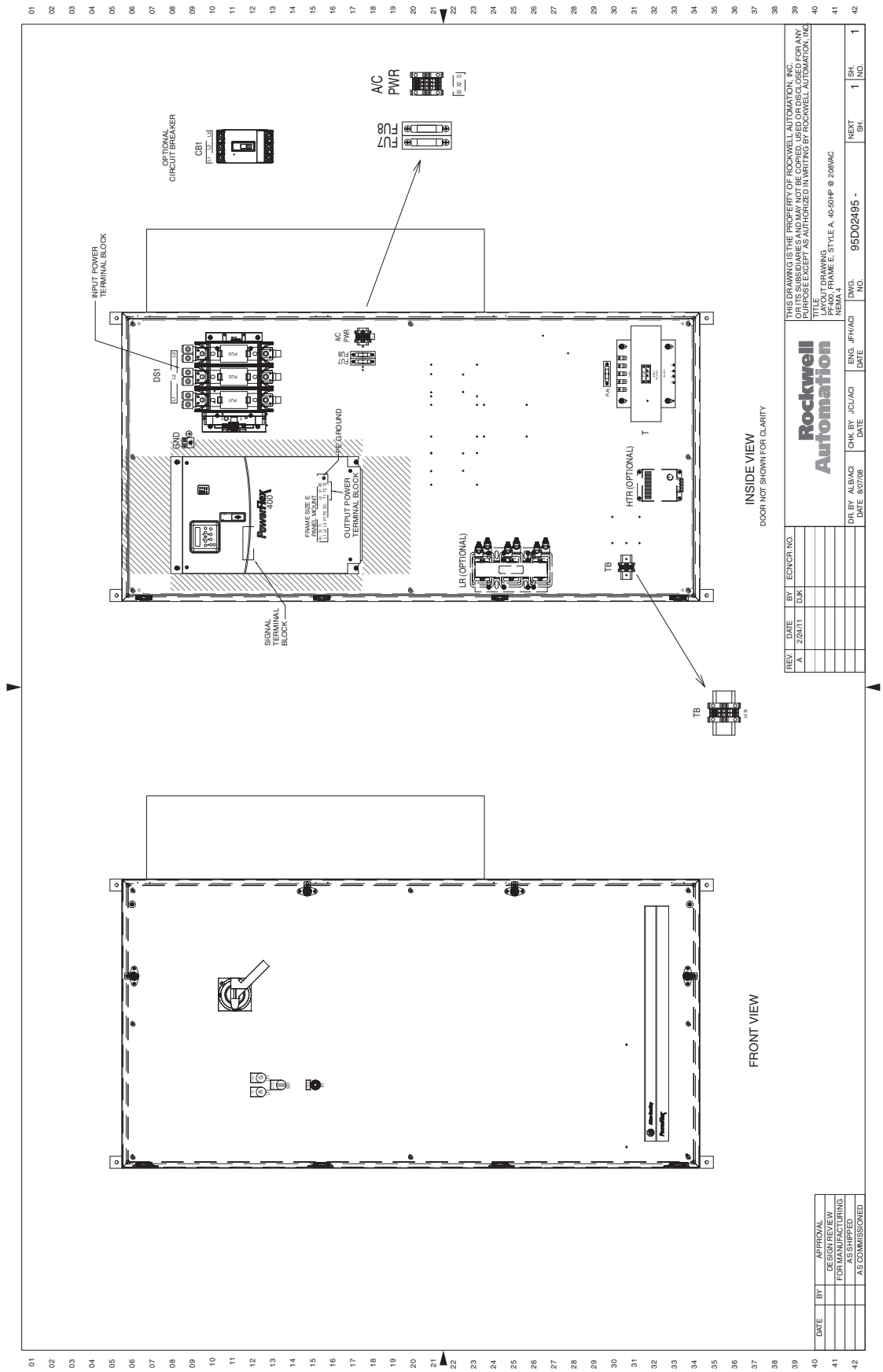


Figure 39 - 50…60 Hp, 460V AC Drives - NEMA/UL Type 4

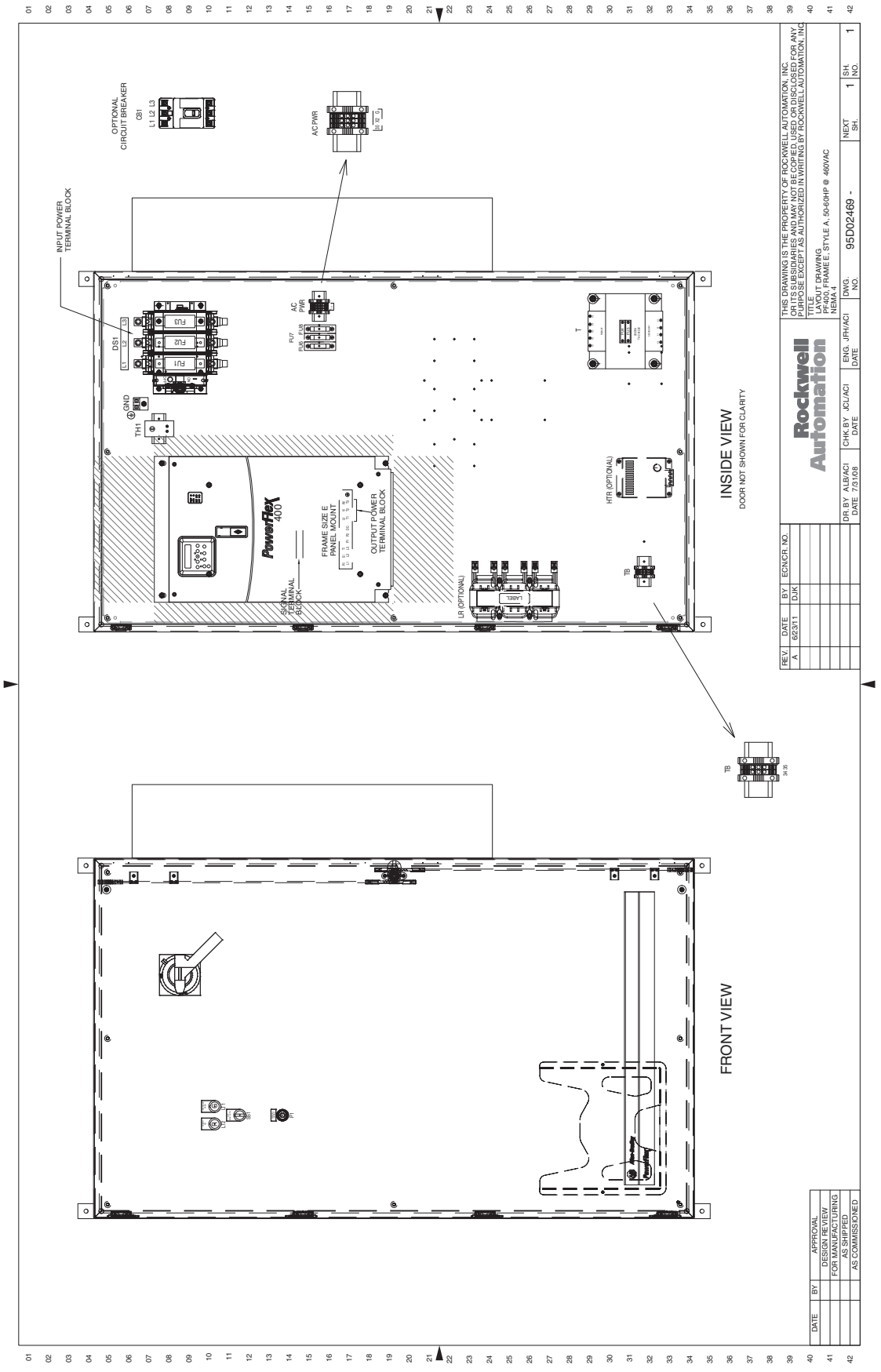


Figure 40 - 75…100 Hp, 460V AC Drives - NEMA/UL Type 4

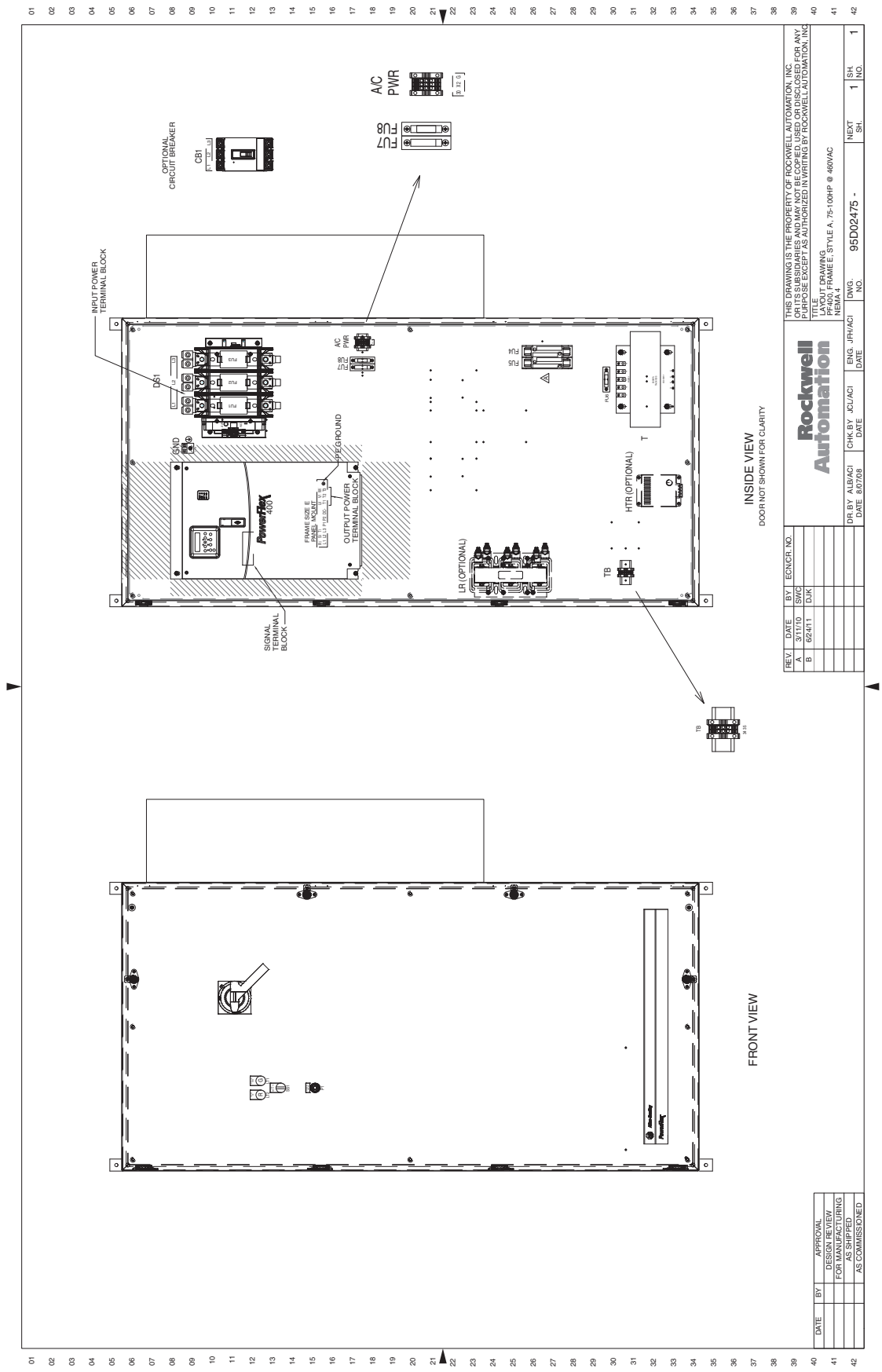


Figure 41 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 4

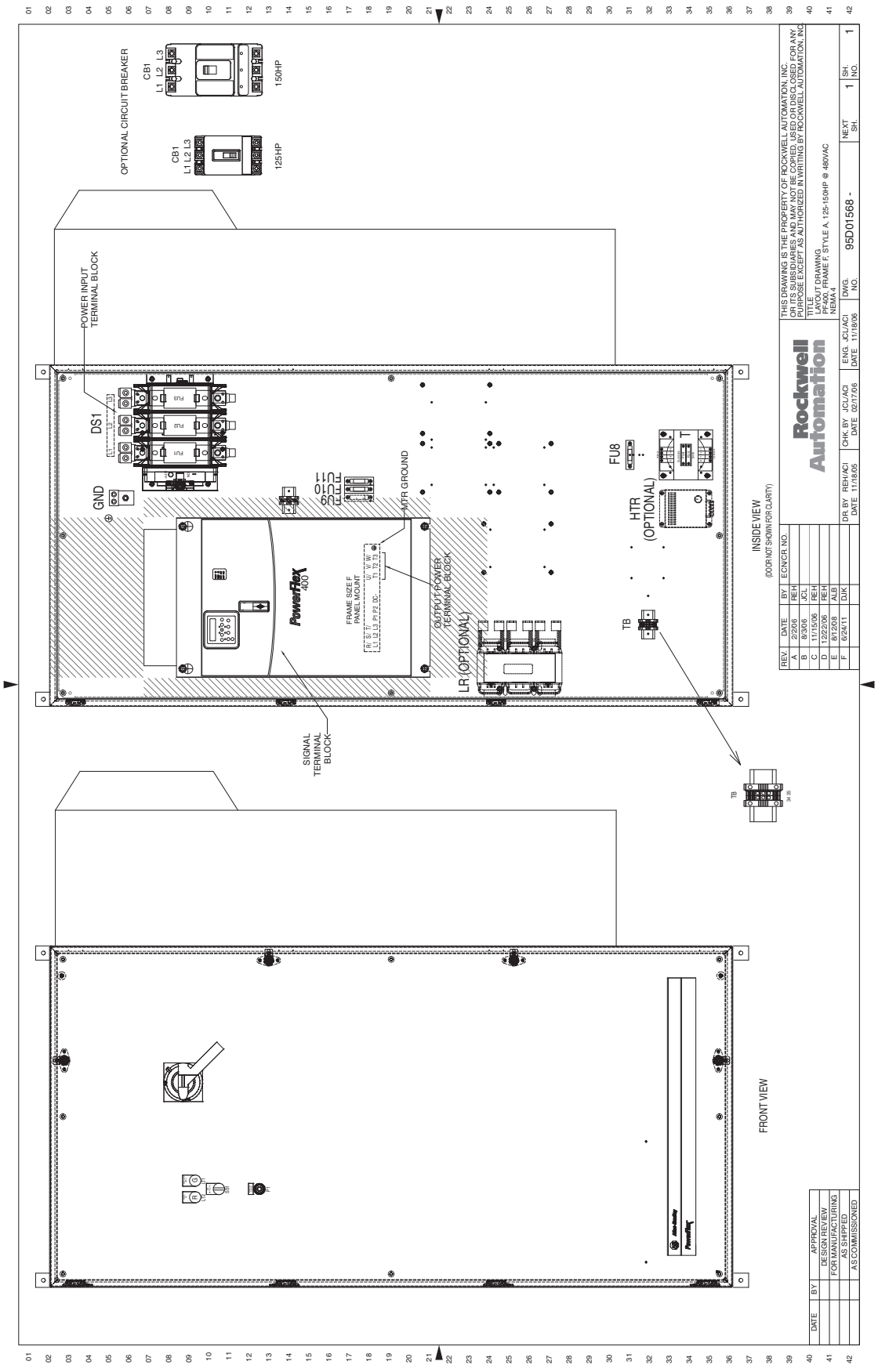


Figure 42 - 3.0…10 Hp, 208V AC and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 3R

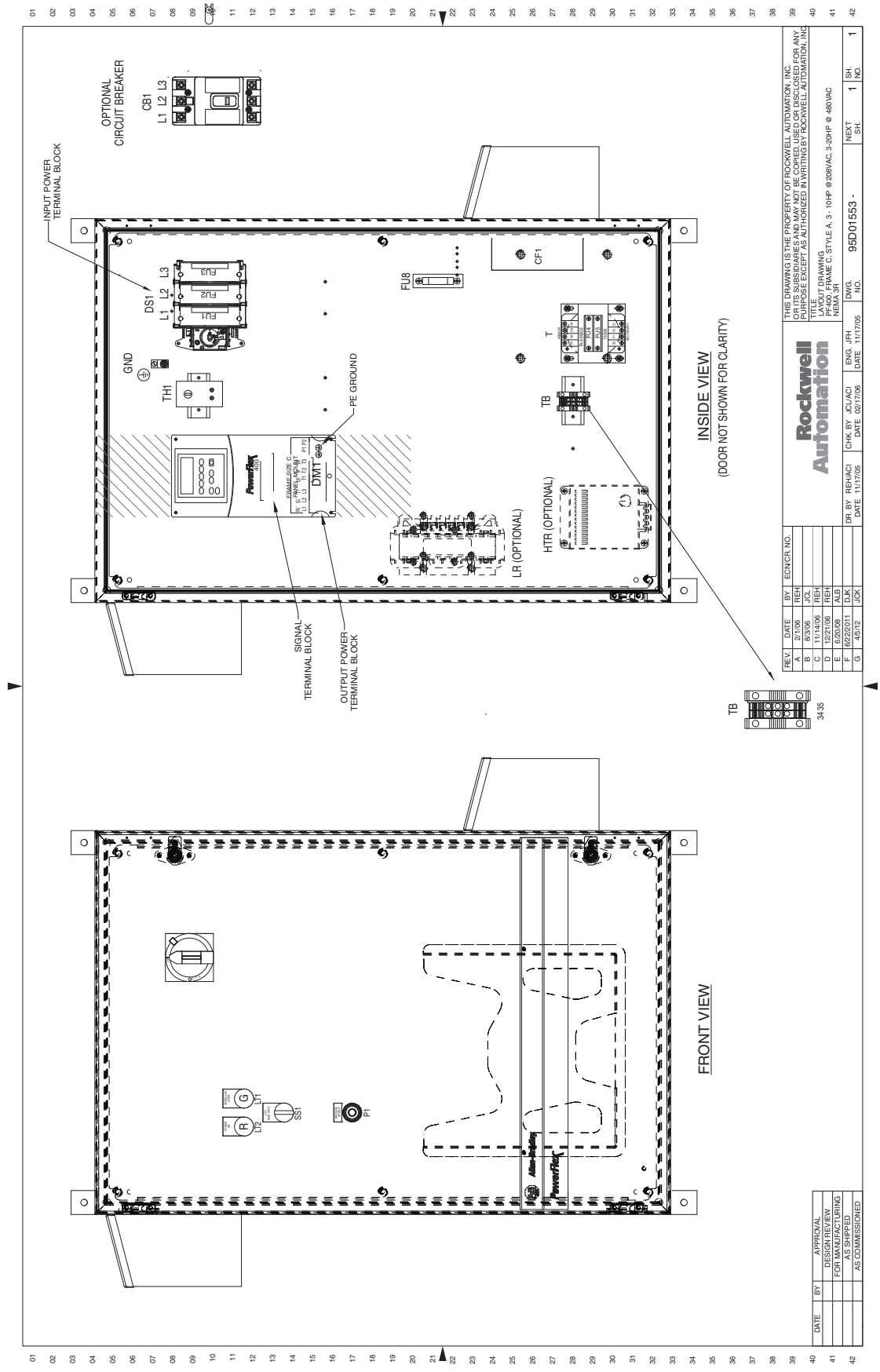


Figure 43 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 3R

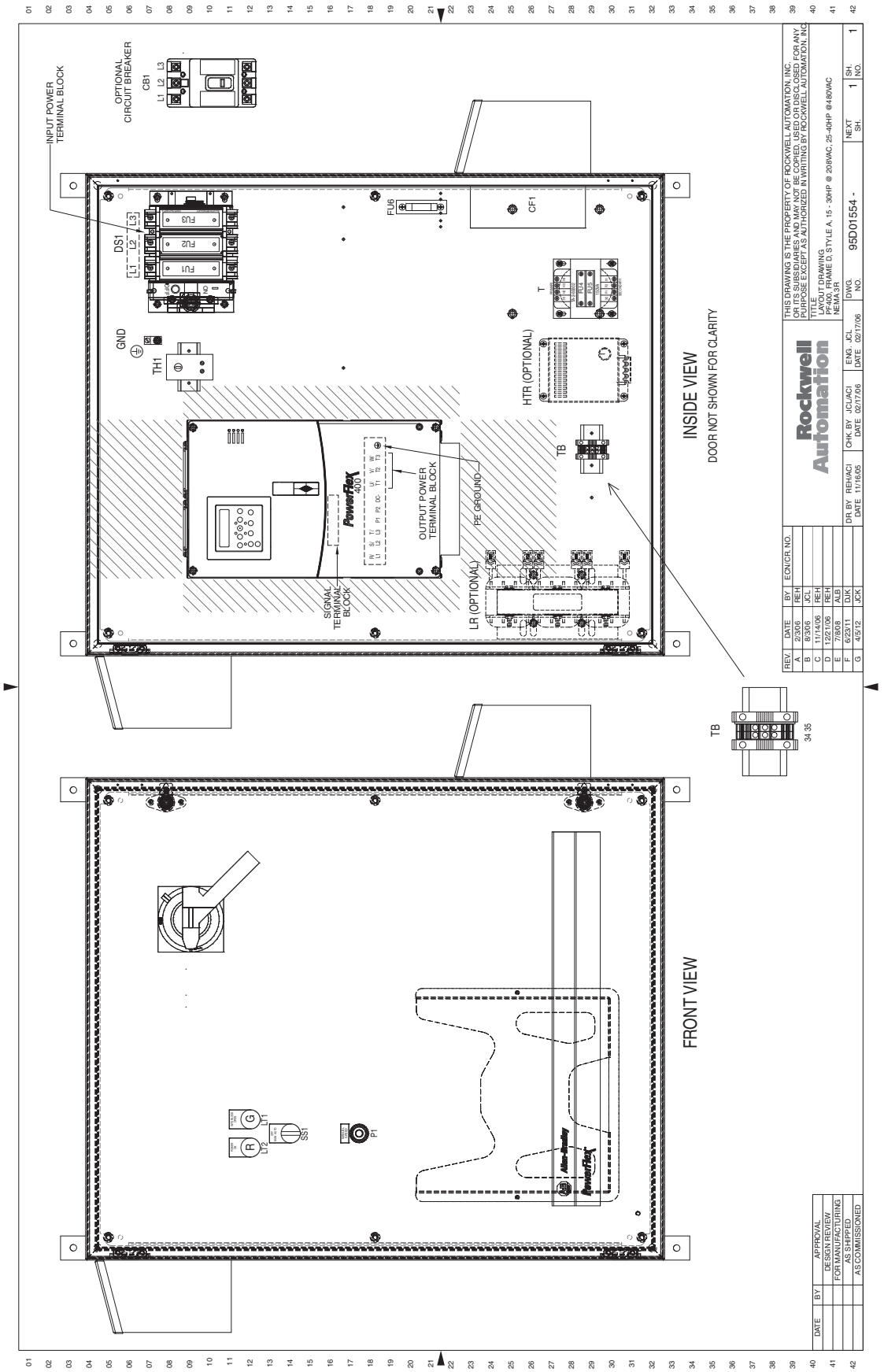


Figure 44 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 3R

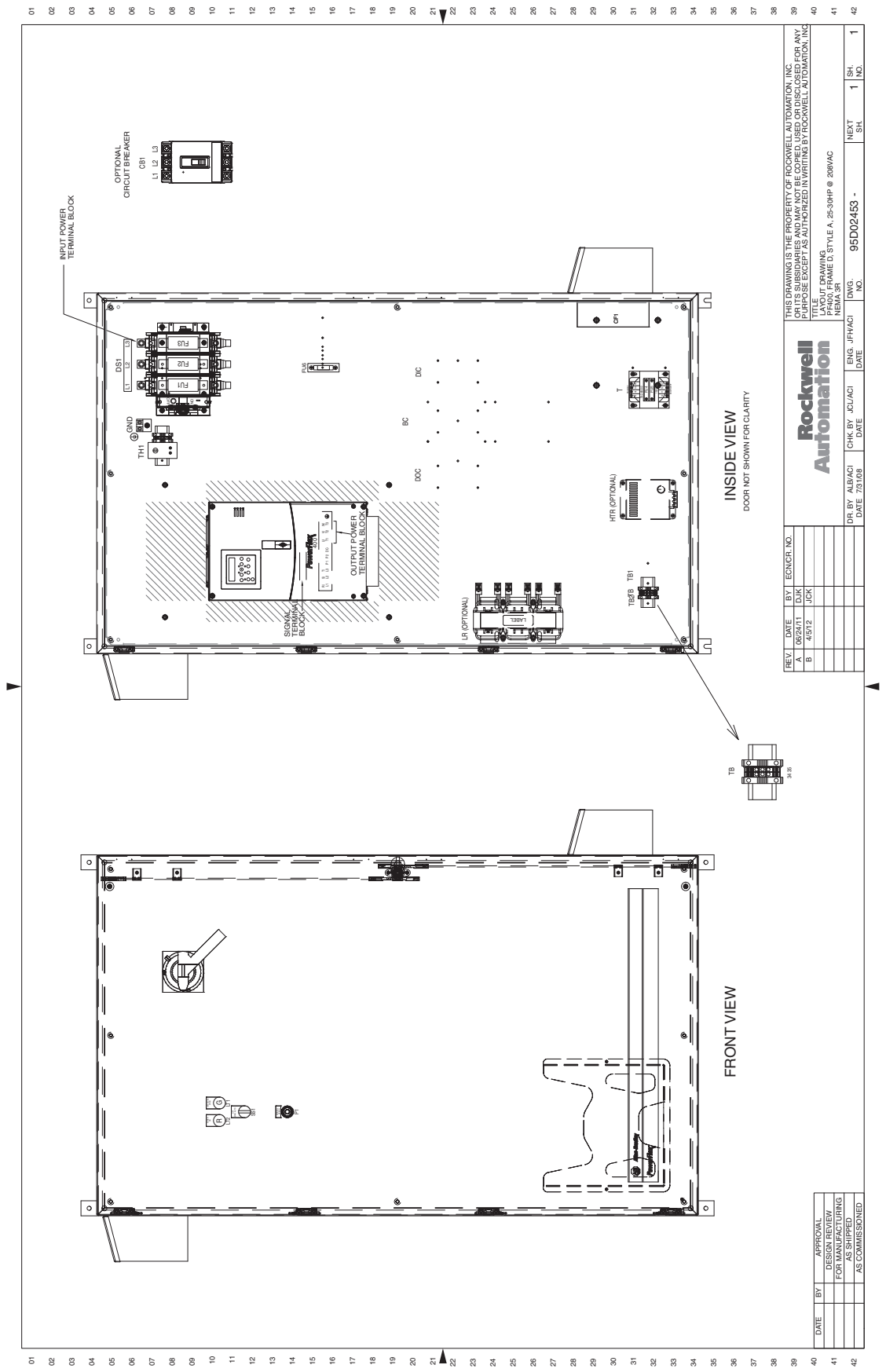


Figure 45 - 40…50 Hp, 208V AC Drives - NEMA/UL Type 3R

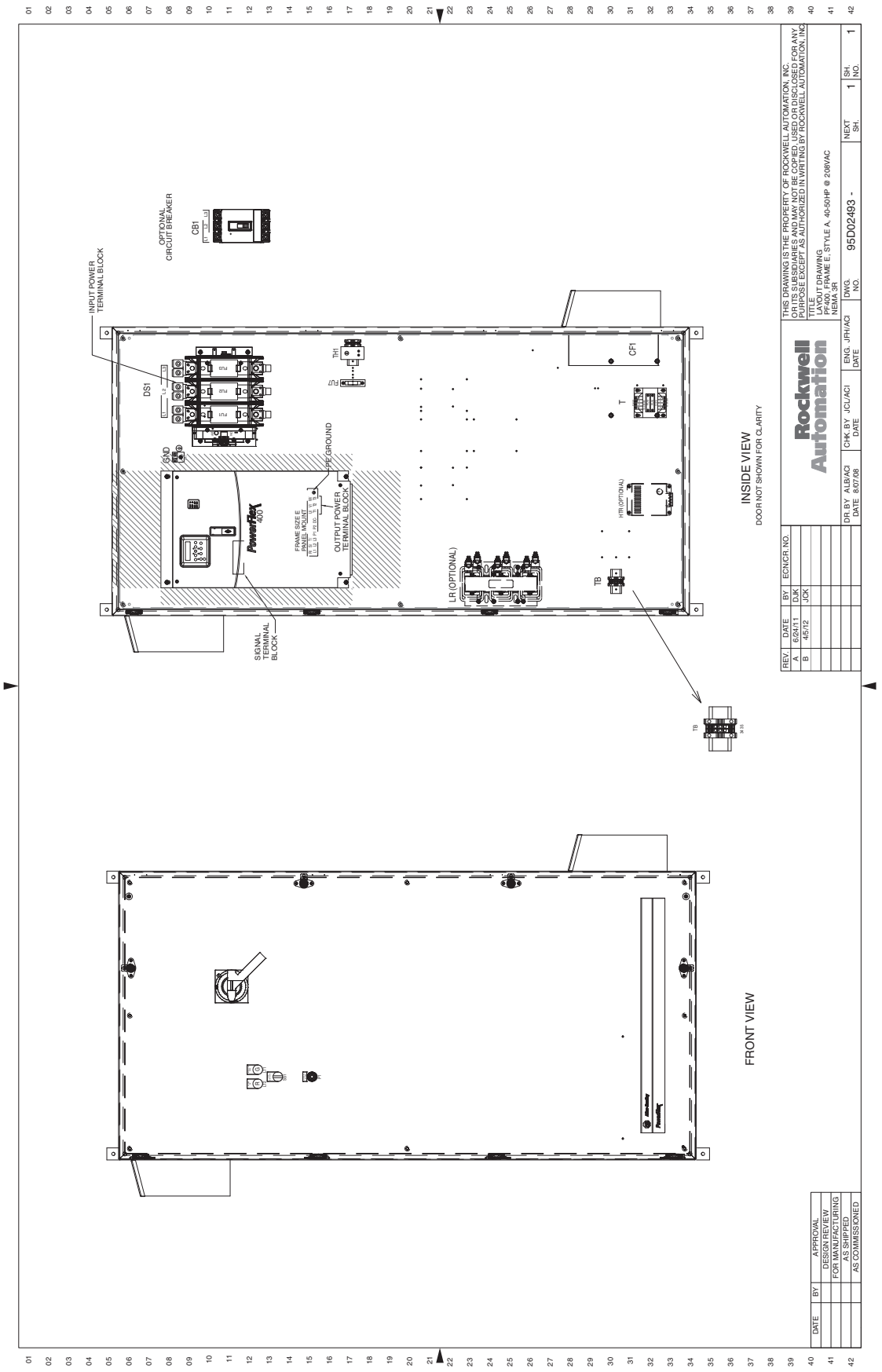


Figure 46 - 50…60 Hp, 460V AC Drives - NEMA/UL Type 3R

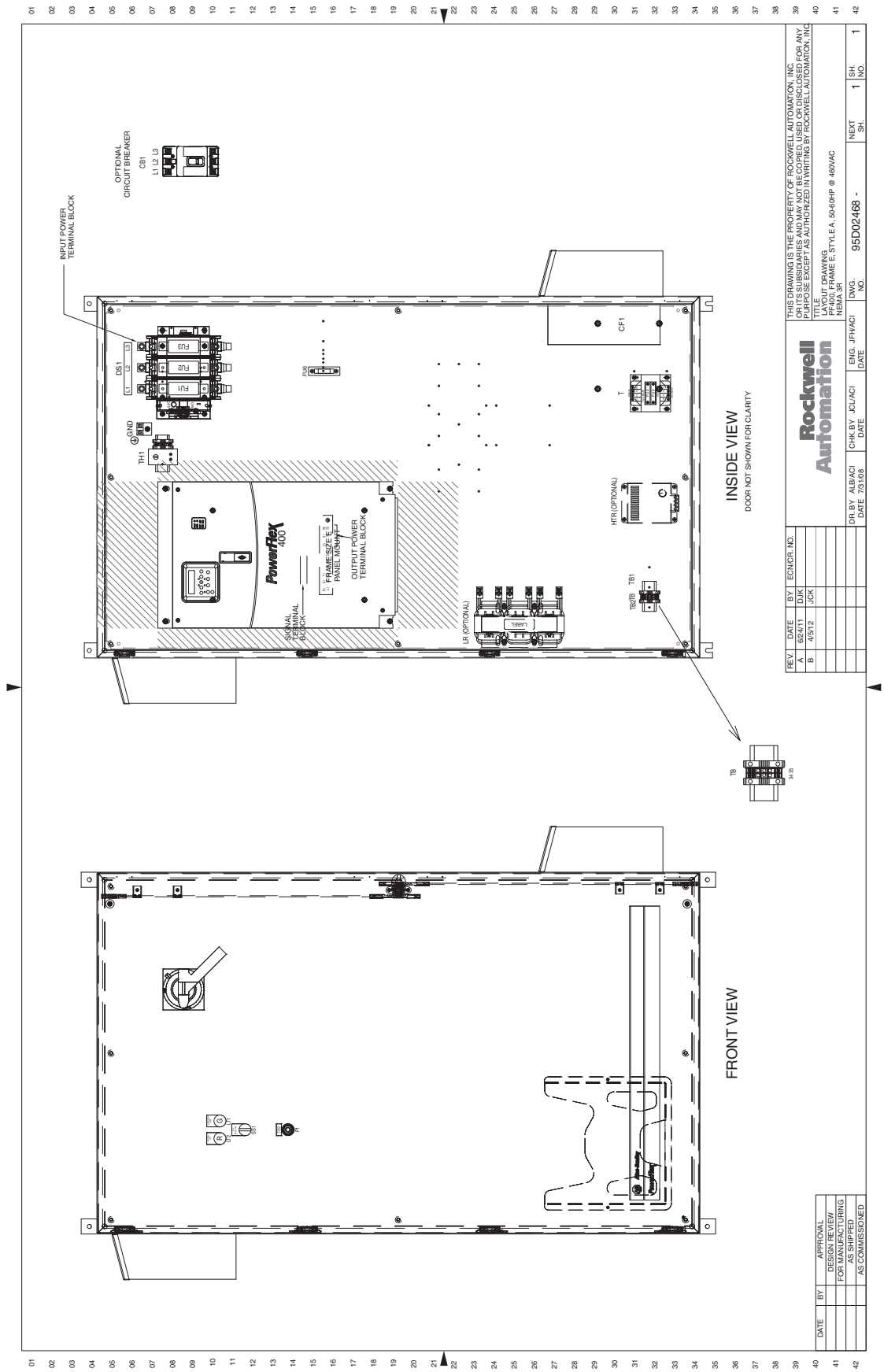


Figure 47 - 75…100 Hp, 460V AC Drives - NEMA/UL Type 3R

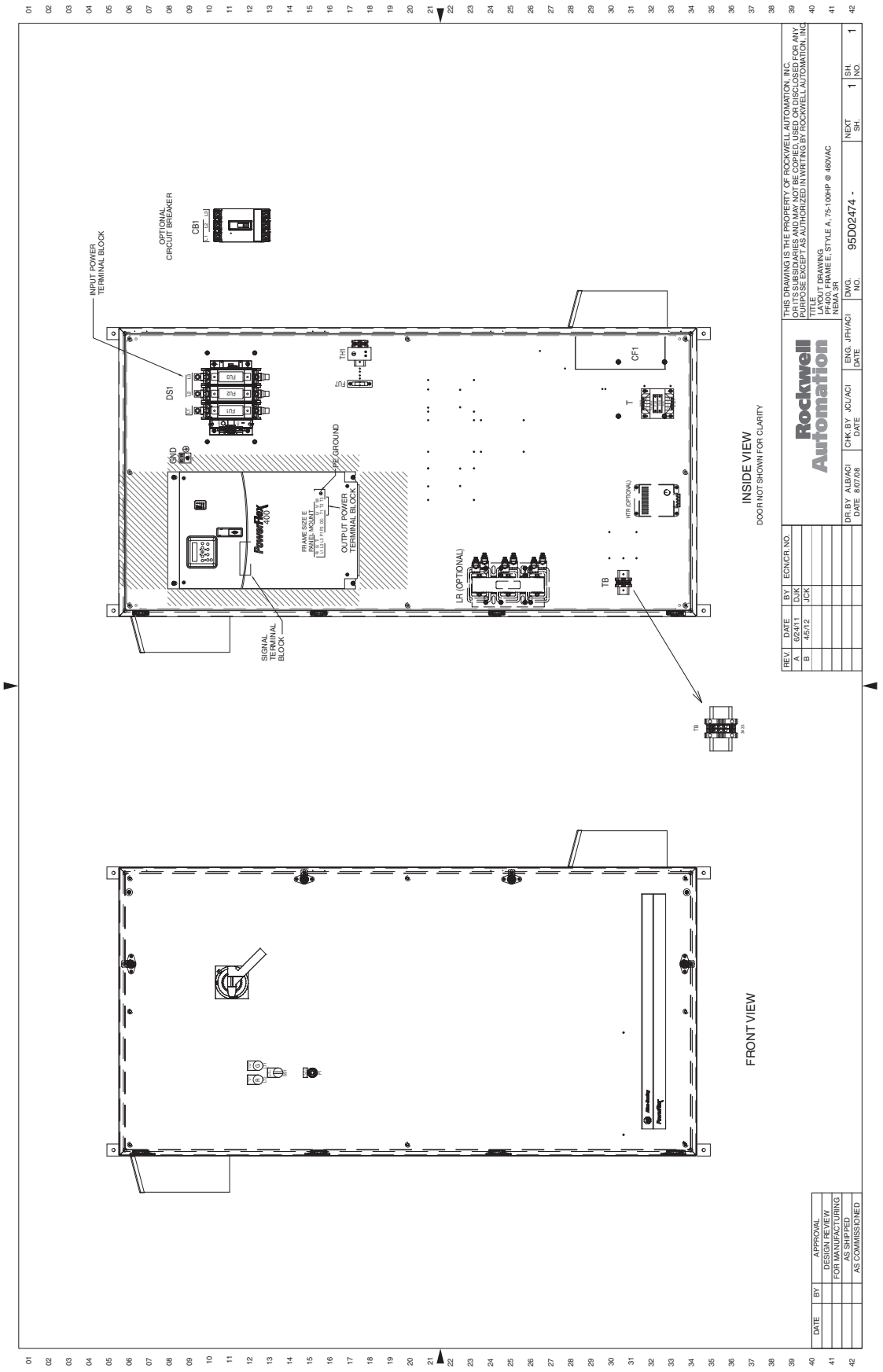
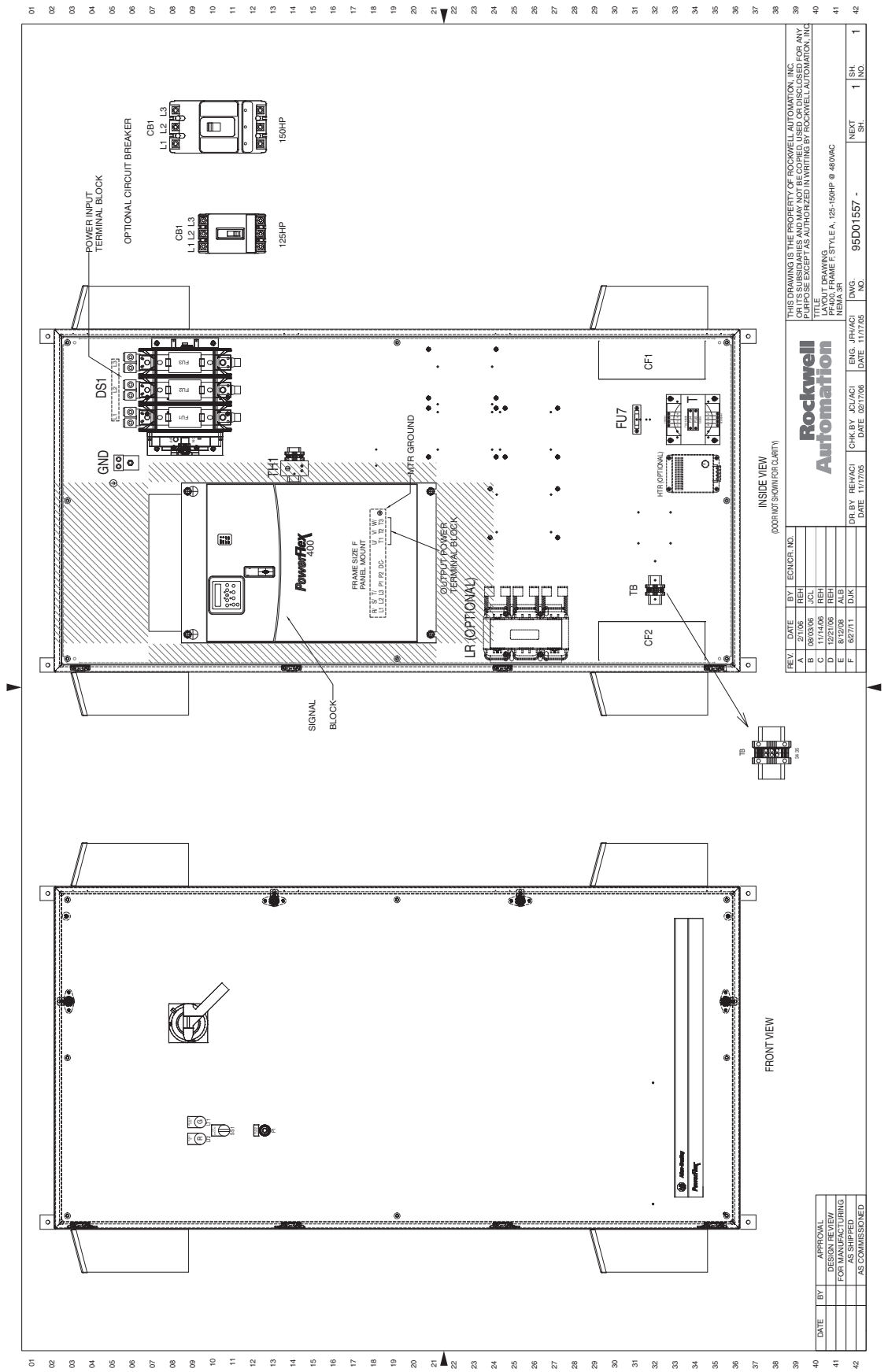


Figure 48 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 3R



Outline Drawings

Figure 49 - 3.0…10 Hp, 208V AC and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 1

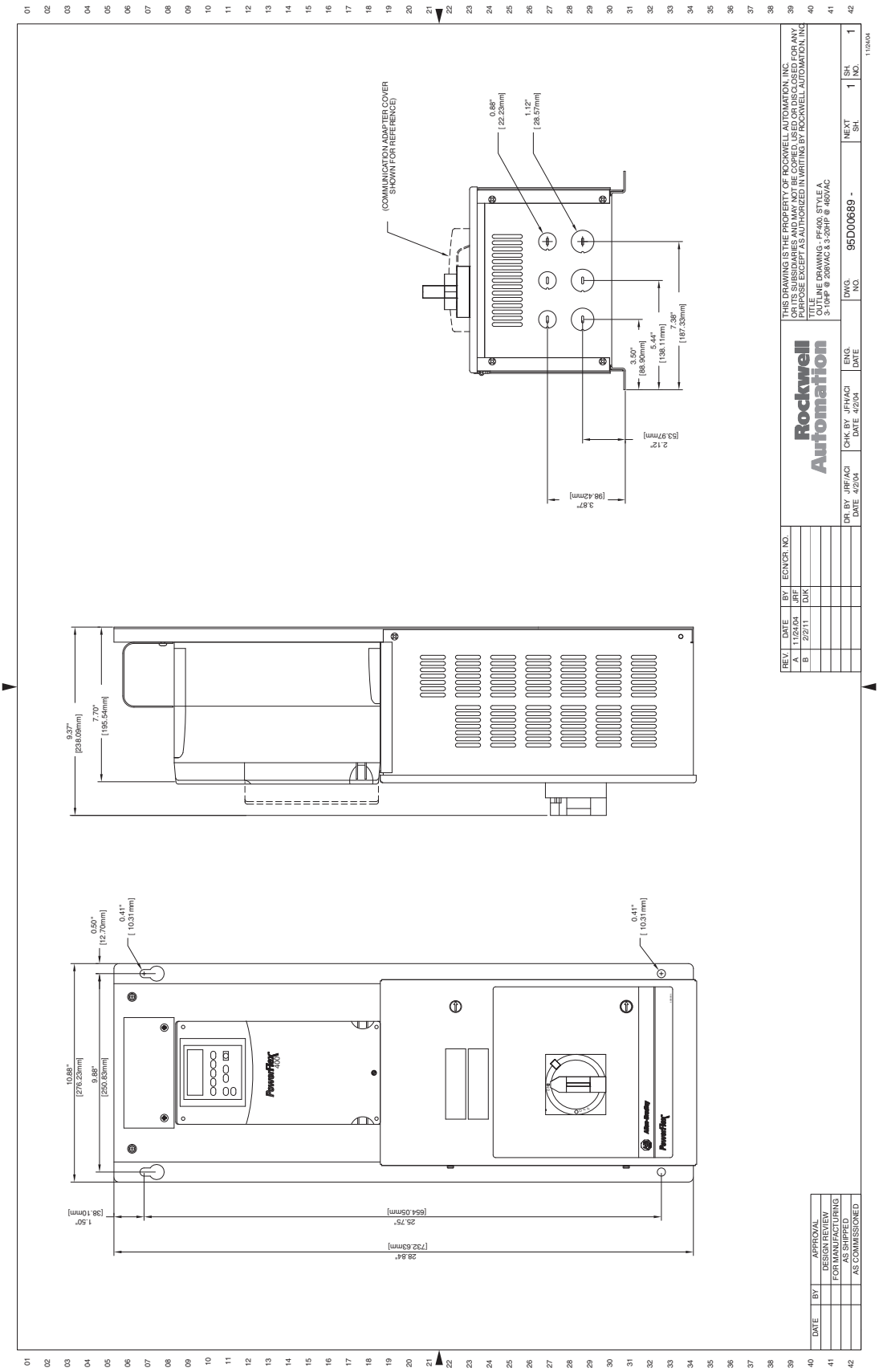


Figure 50 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 1

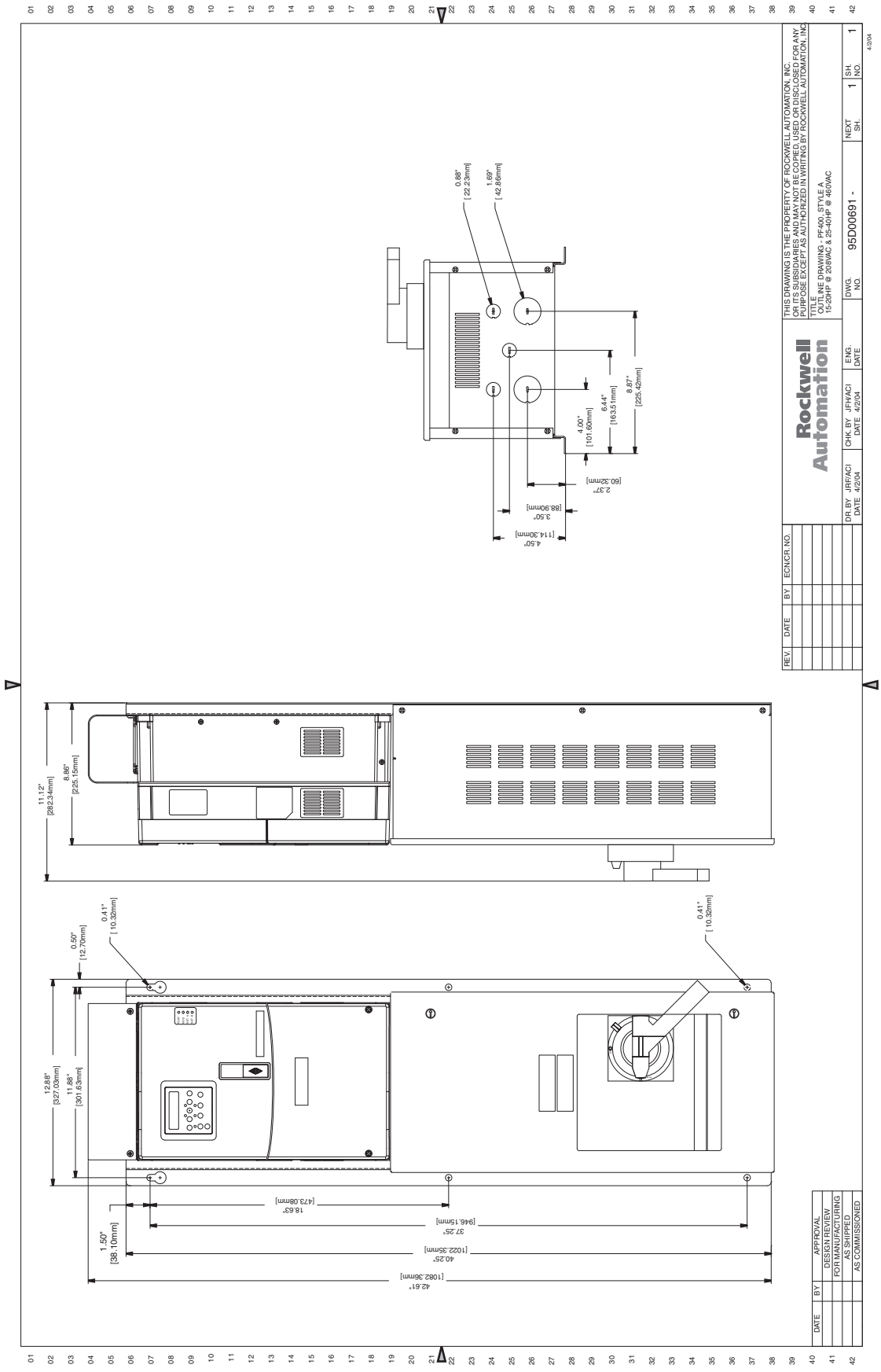


Figure 51 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 1

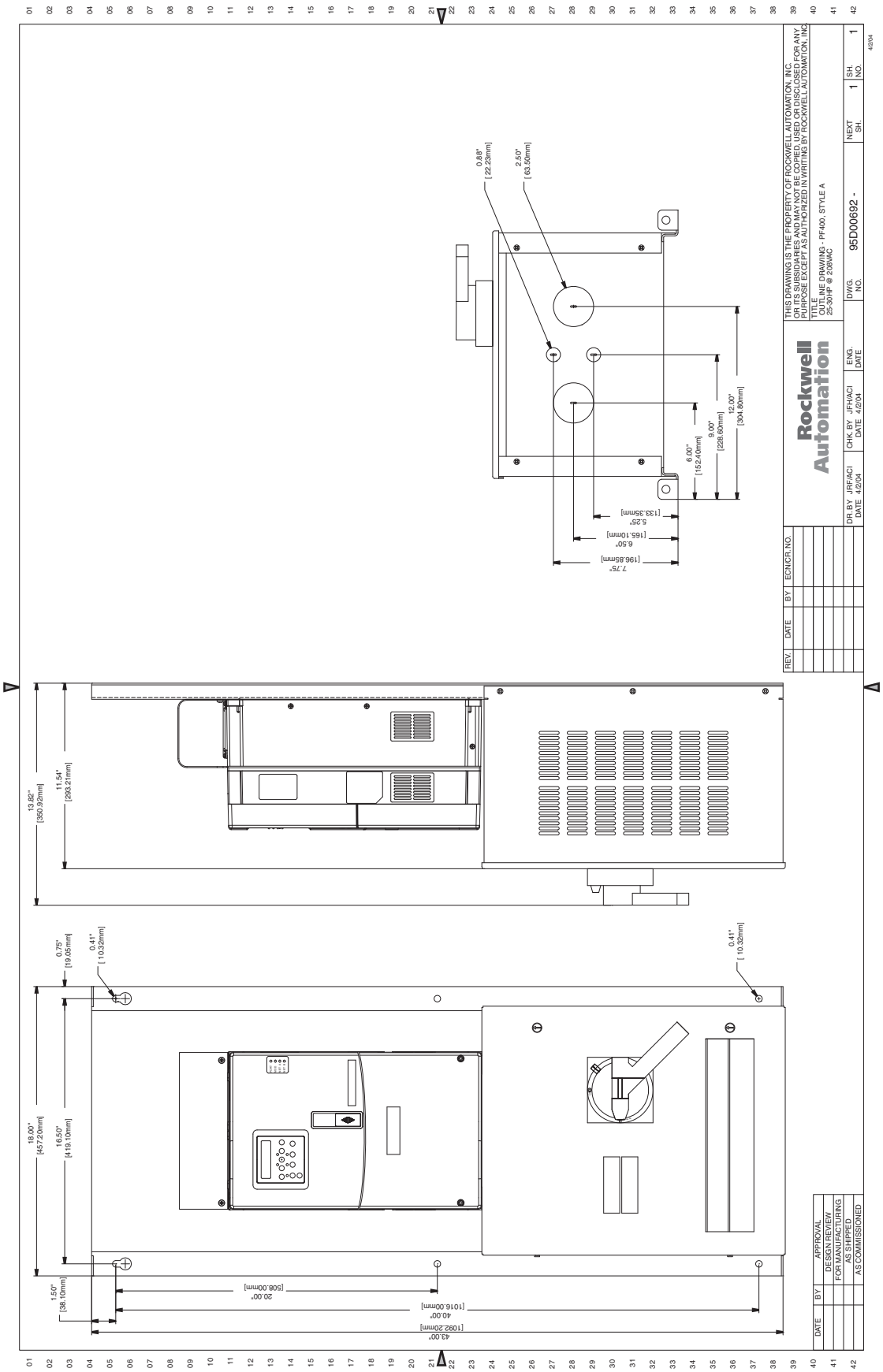


Figure 52 - 40 Hp, 208V AC and 50…100 Hp, 460V AC Drives - NEMA/UL Type 1

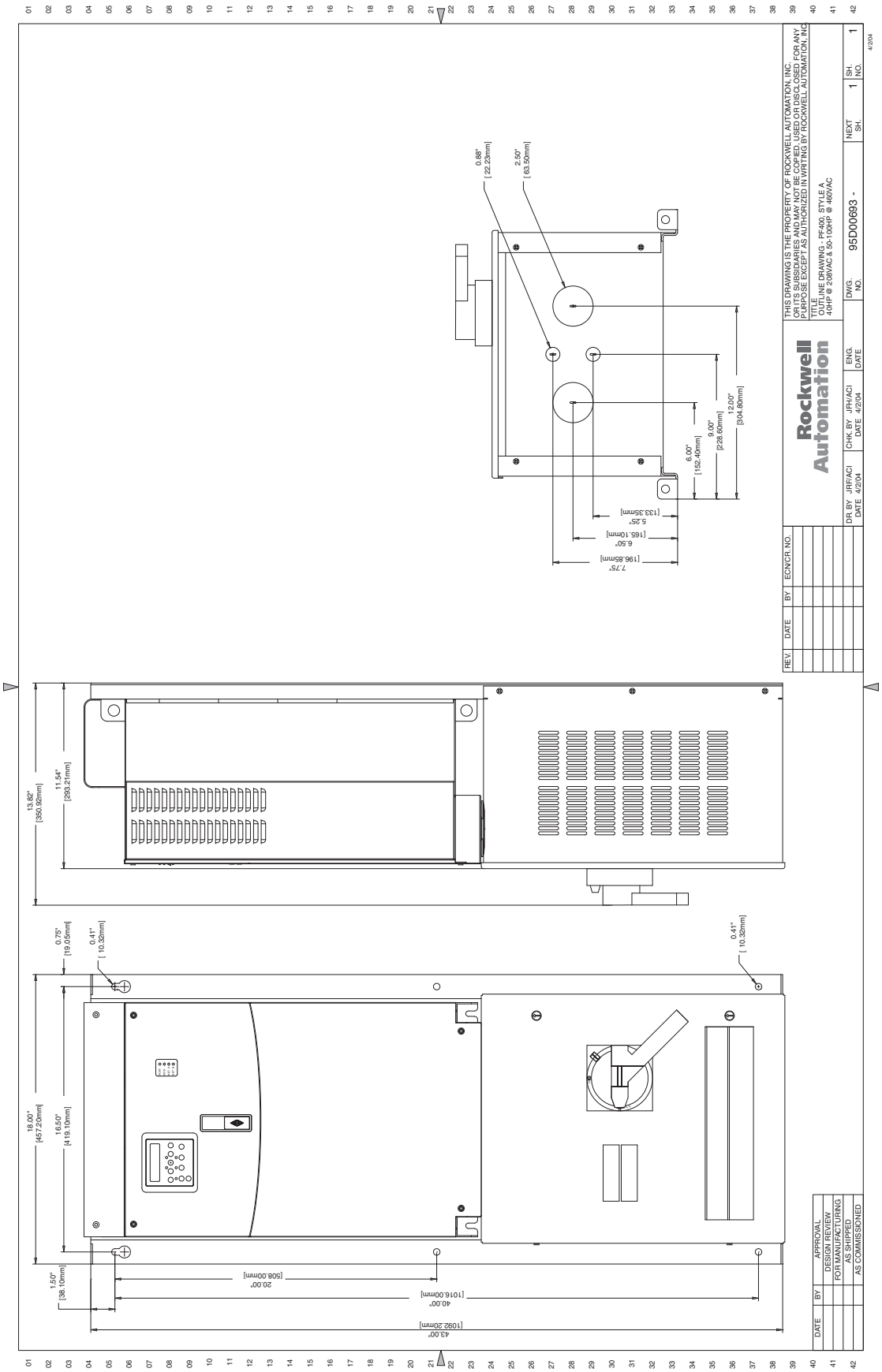


Figure 53 - 50 Hp, 208V AC Drives - NEMA/UL Type 1

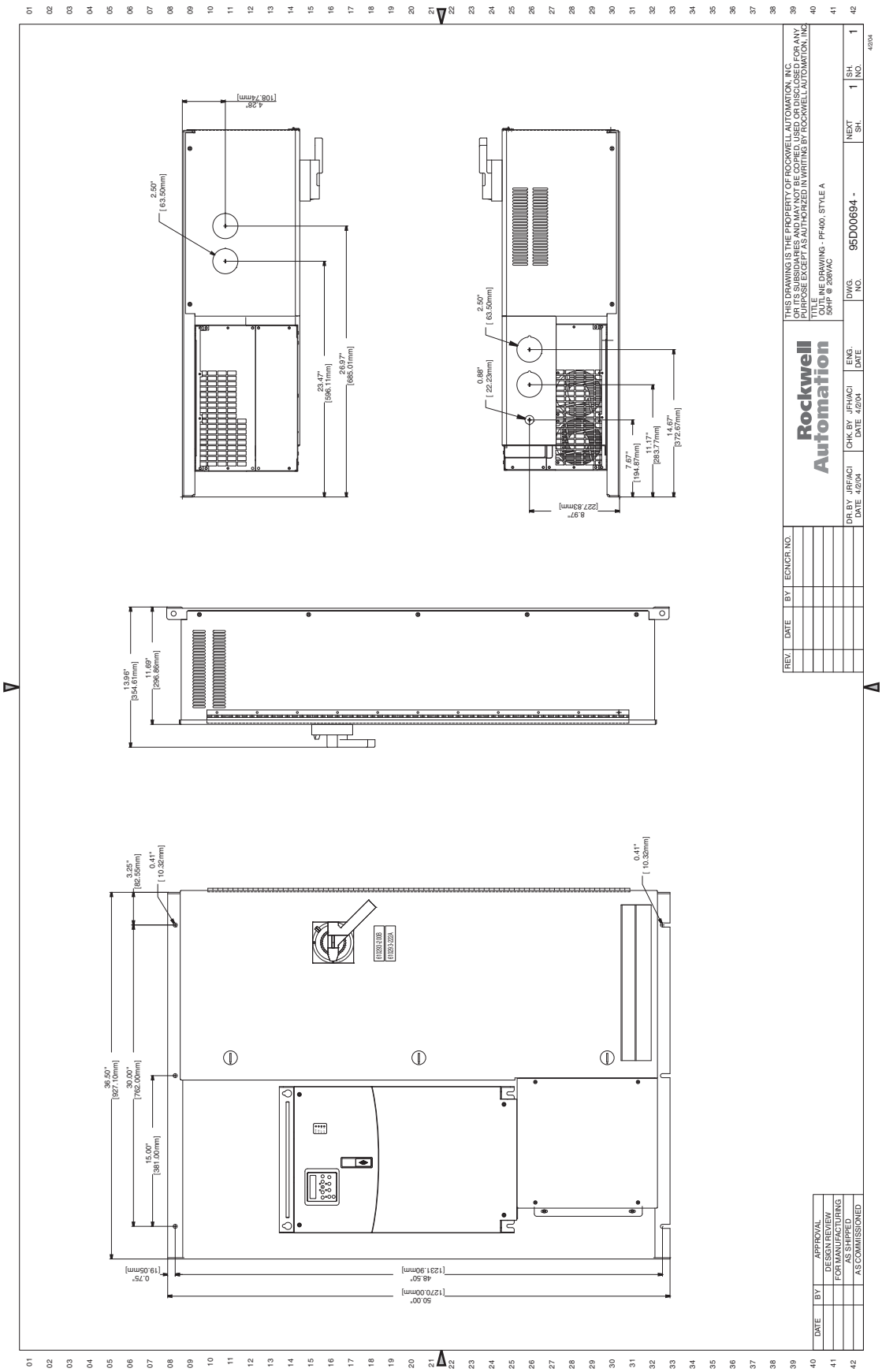


Figure 54 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 1

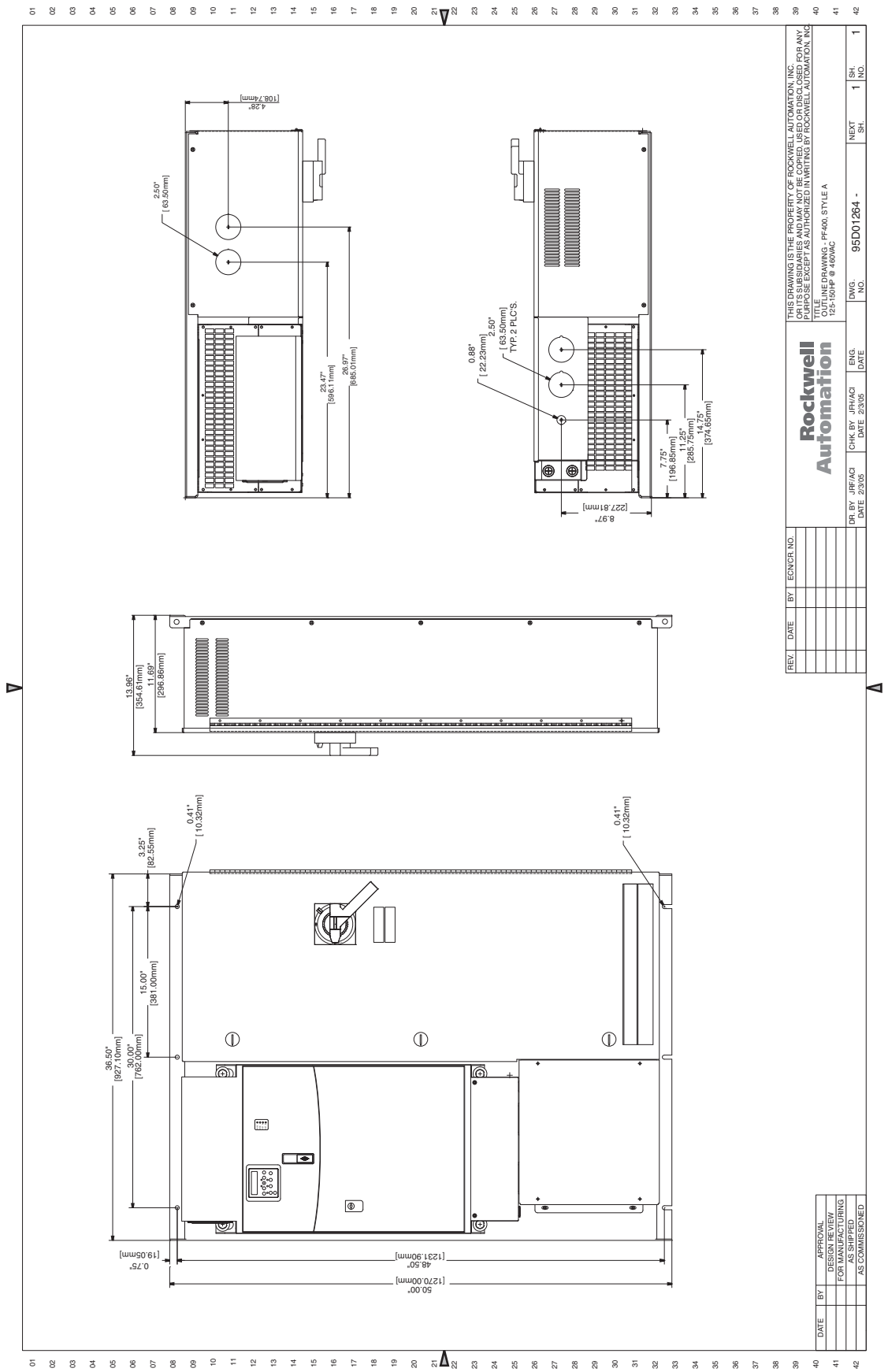


Figure 55 - 200…250 Hp, 460V AC Drives - NEMA/UL Type 1

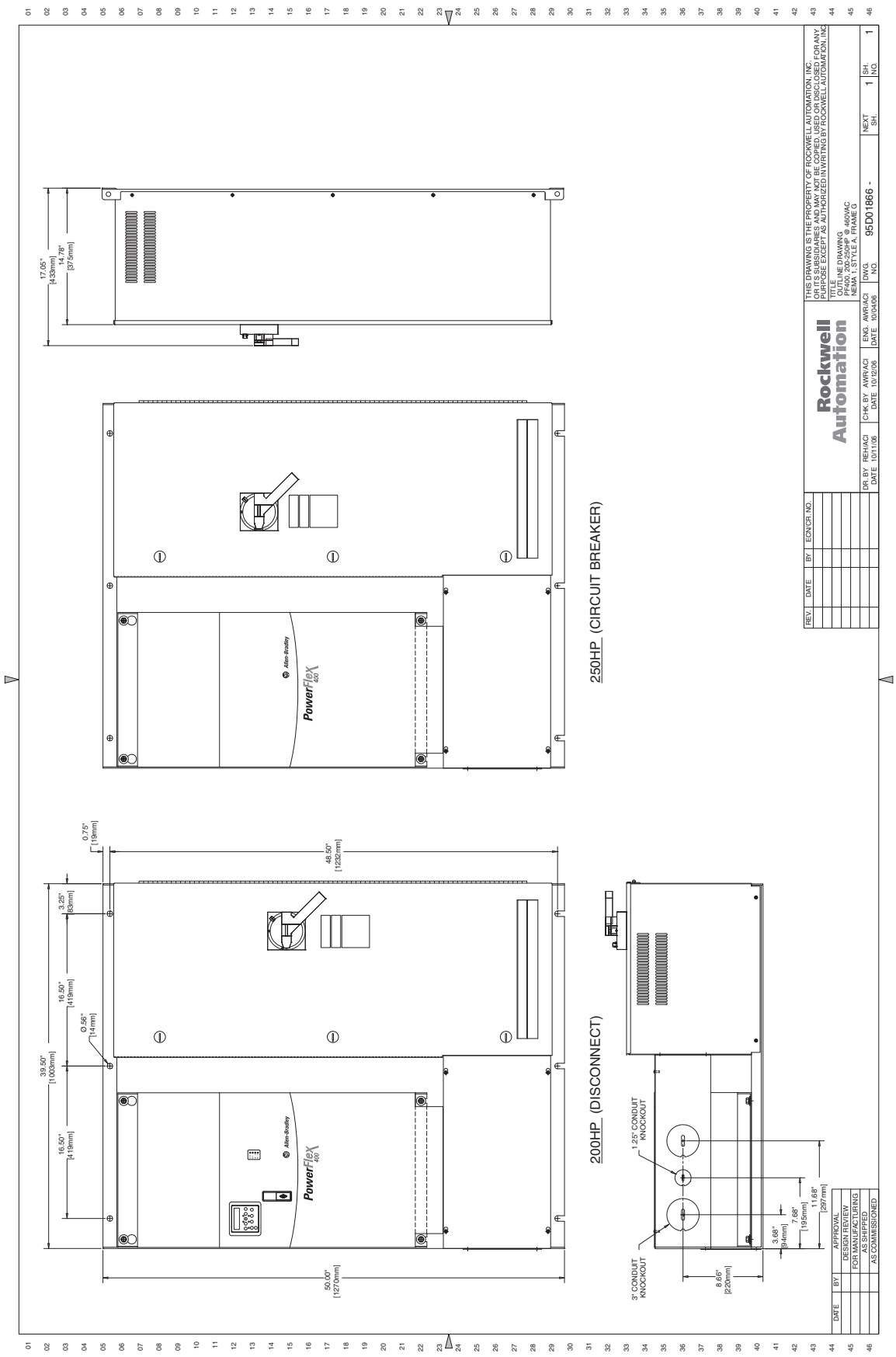


Figure 56 - 300…350 Hp, 460V AC Drives - NEMA/UL Type 1

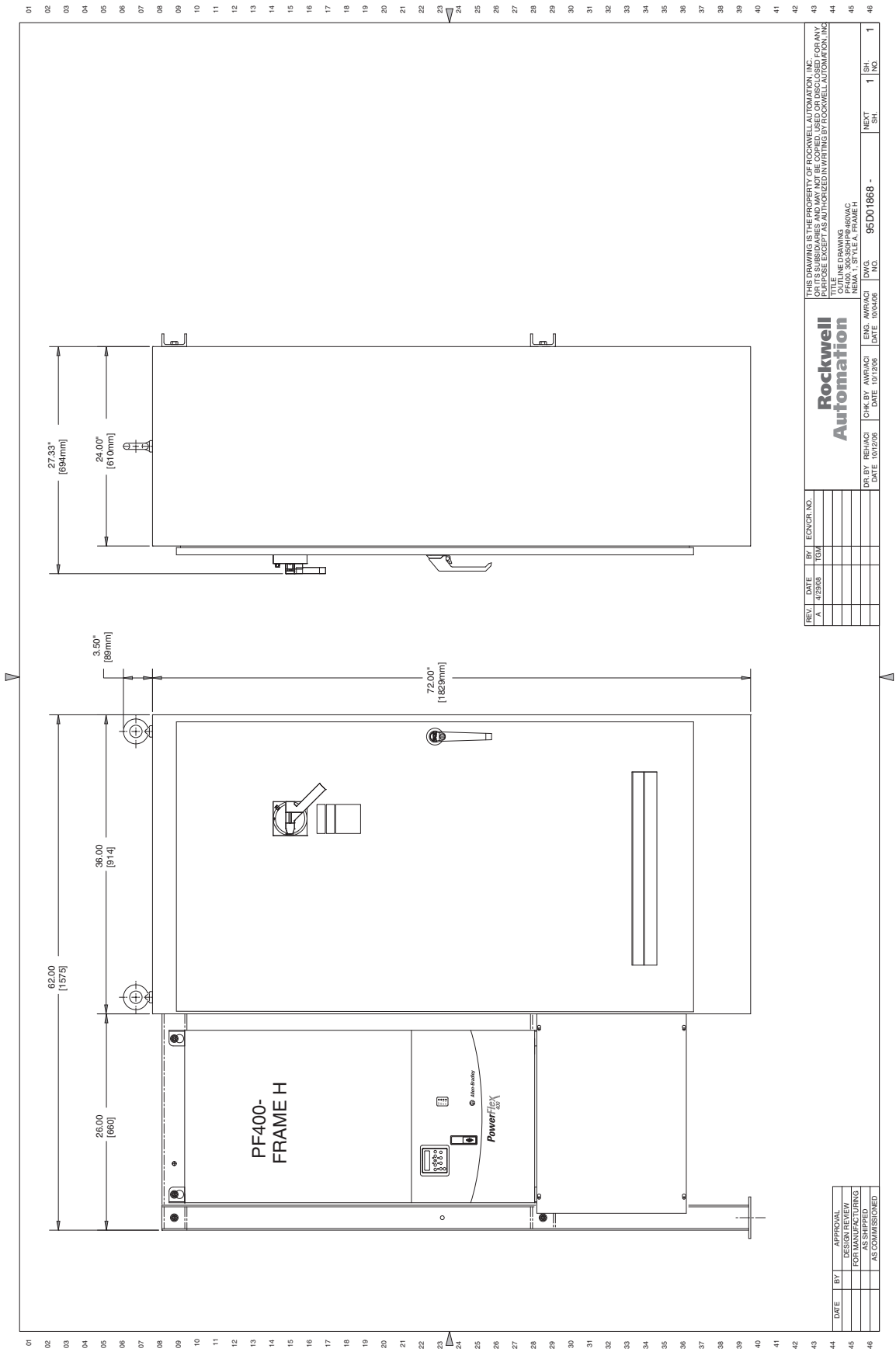


Figure 57 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

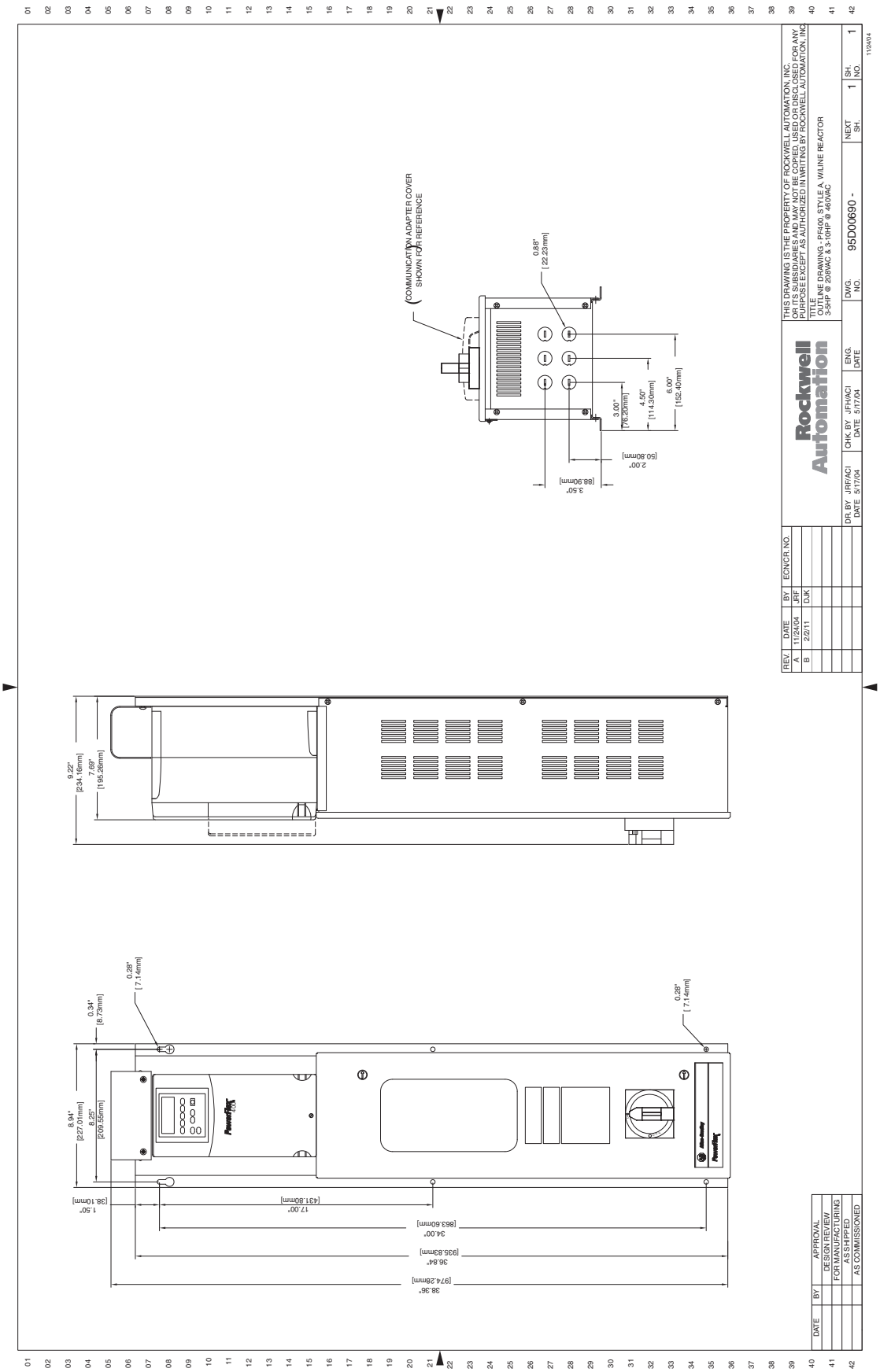


Figure 58 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

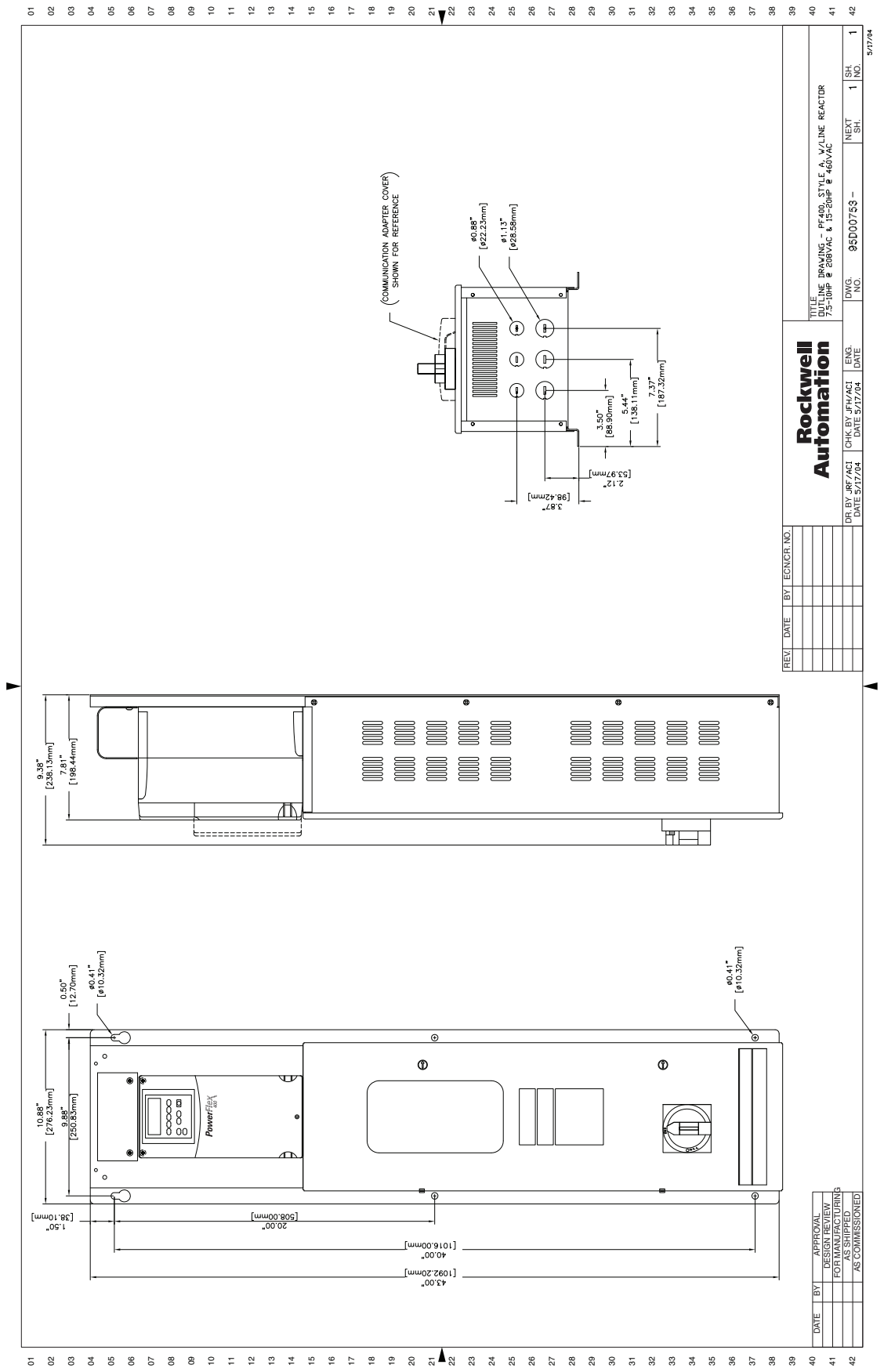


Figure 59 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

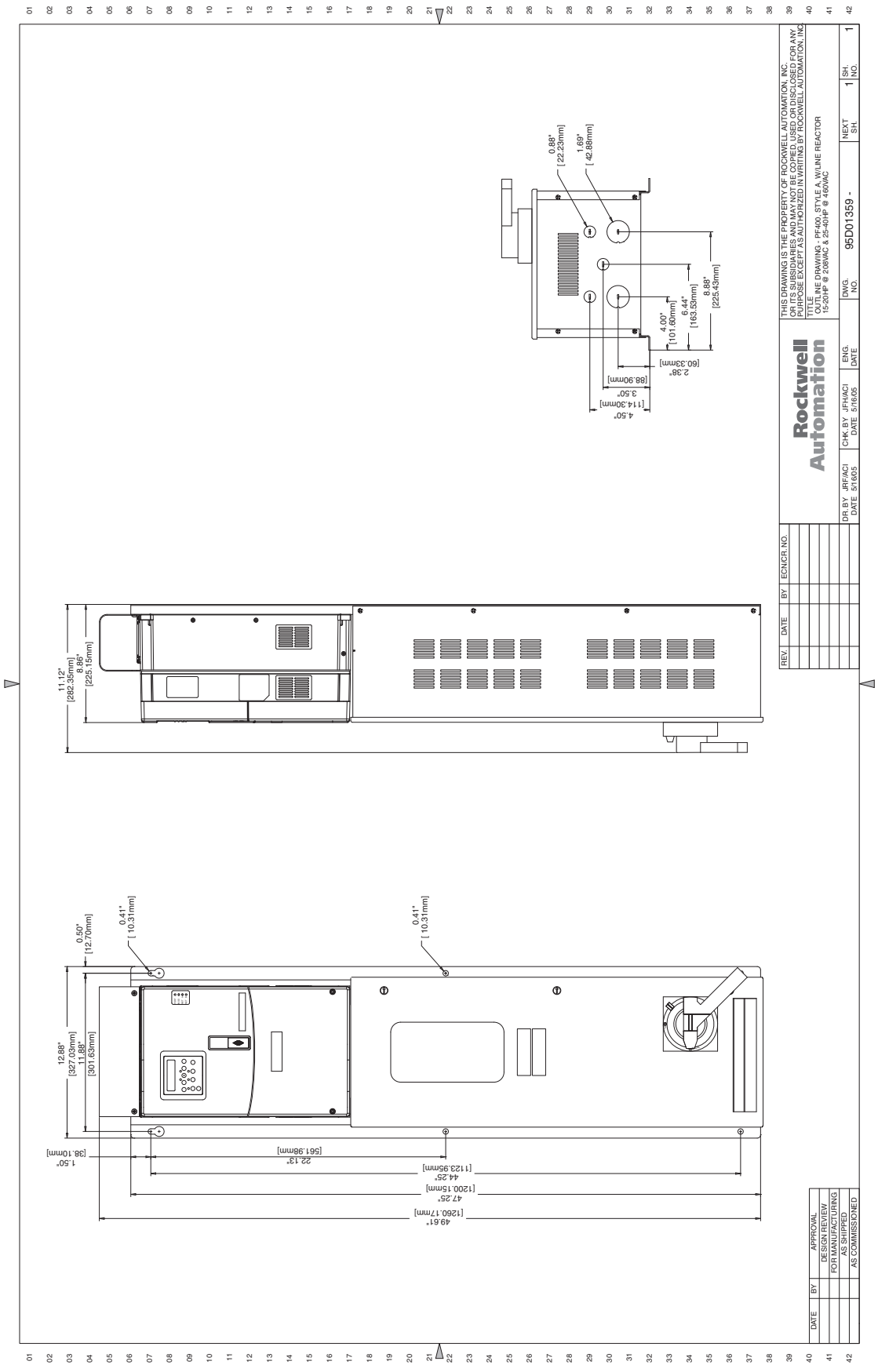


Figure 60 - 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1

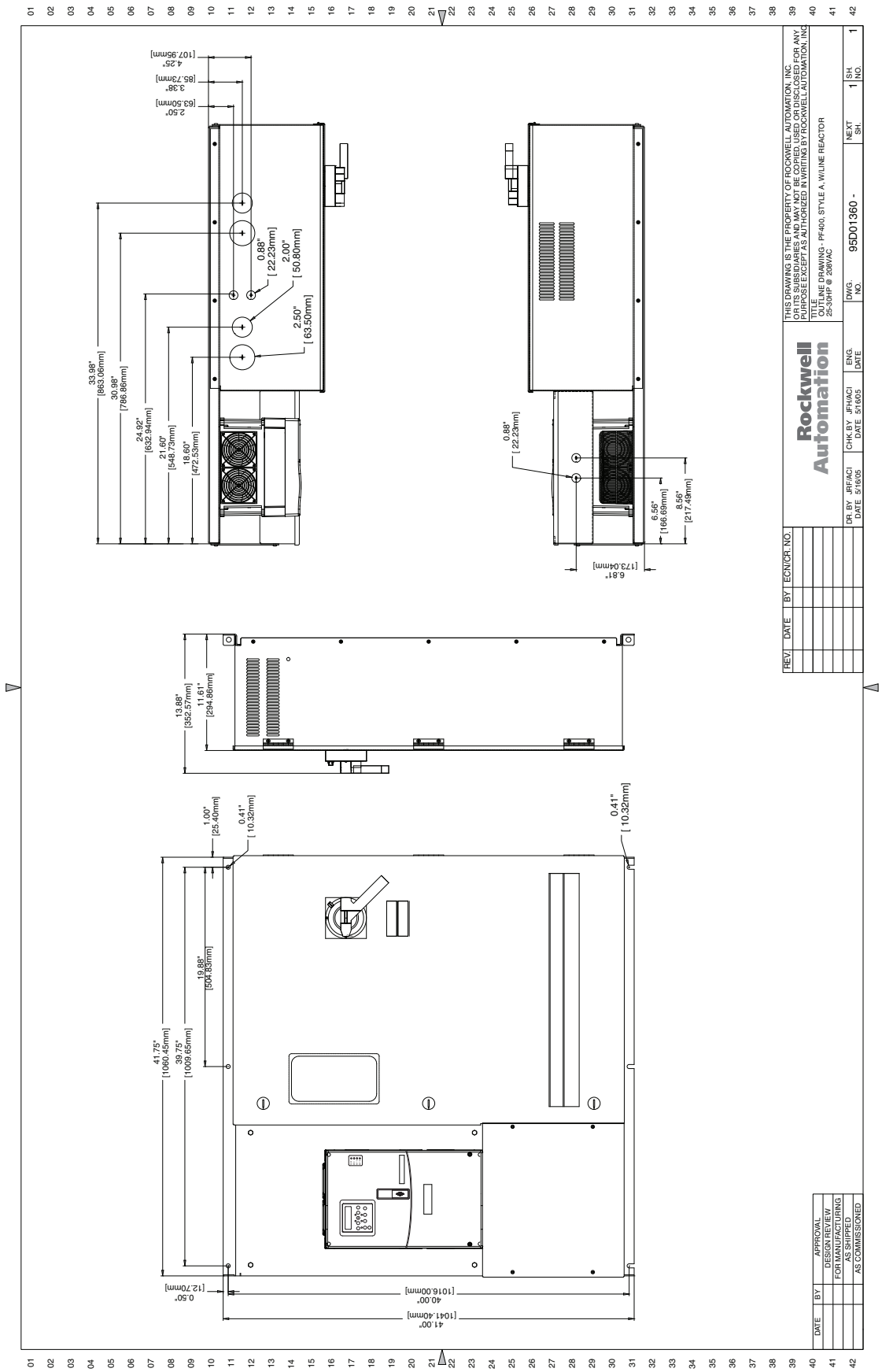


Figure 61 - 40…50 Hp, 208V AC and 50…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

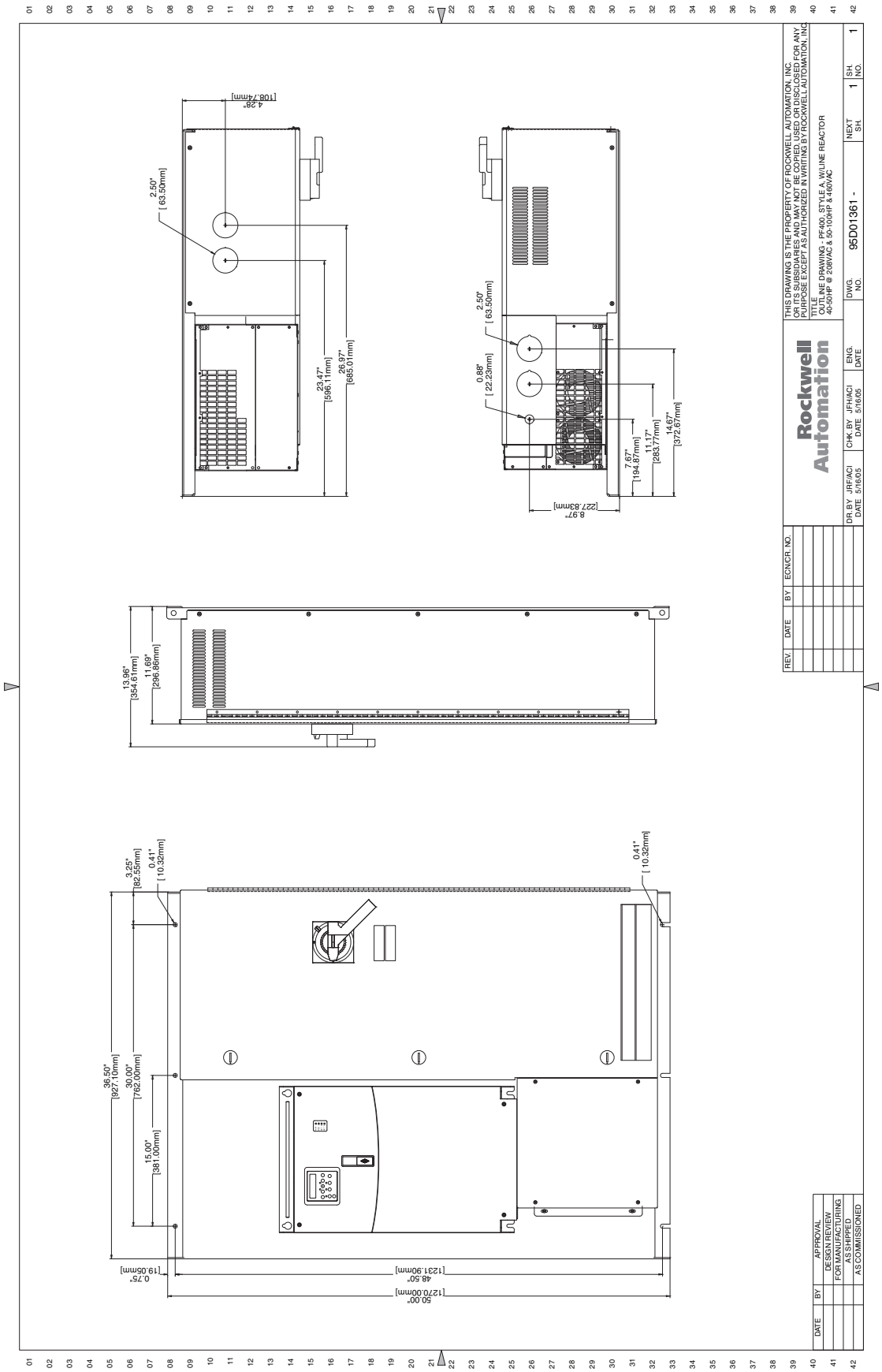


Figure 62 - 125…150 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

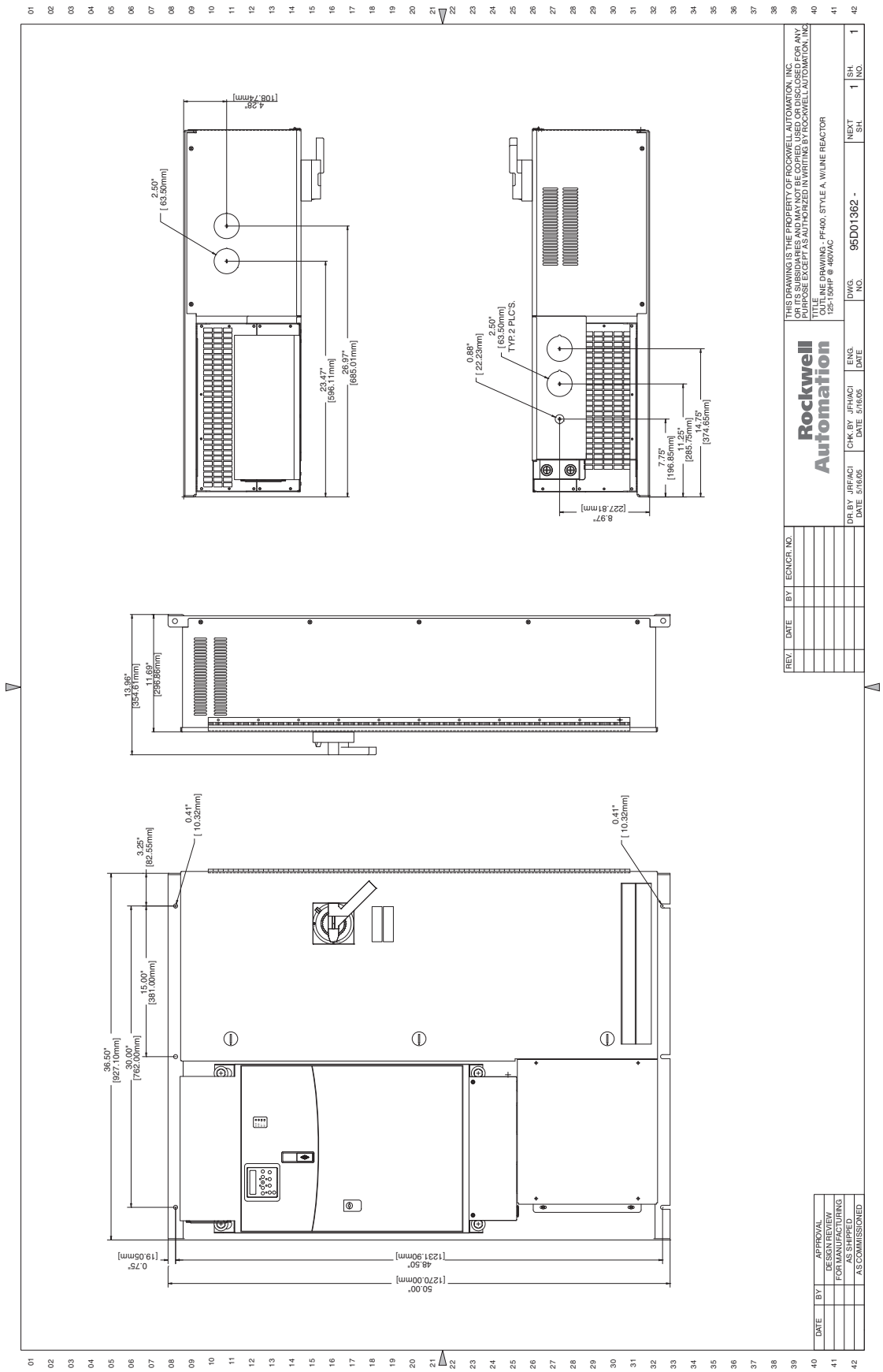


Figure 63 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12

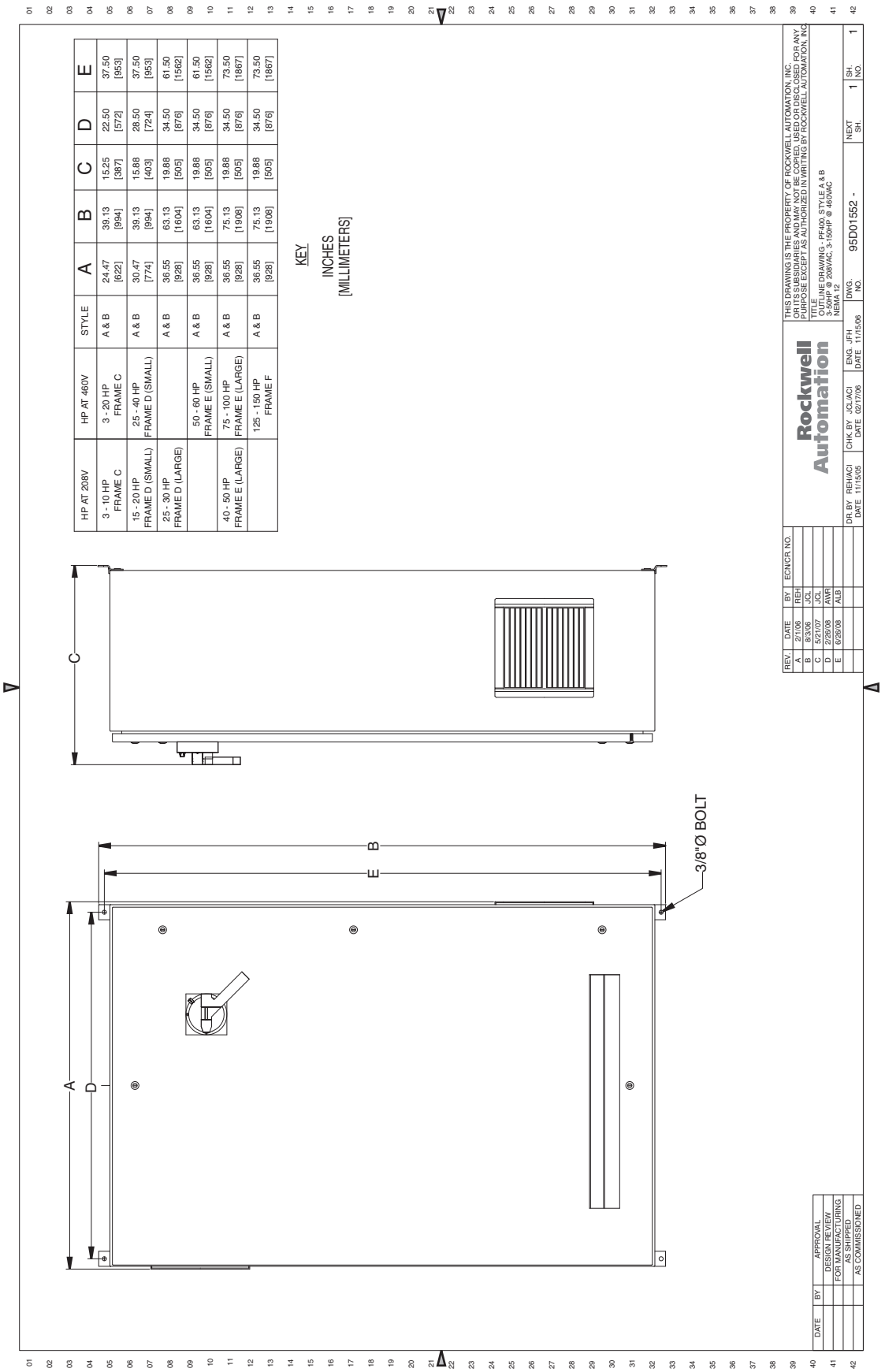
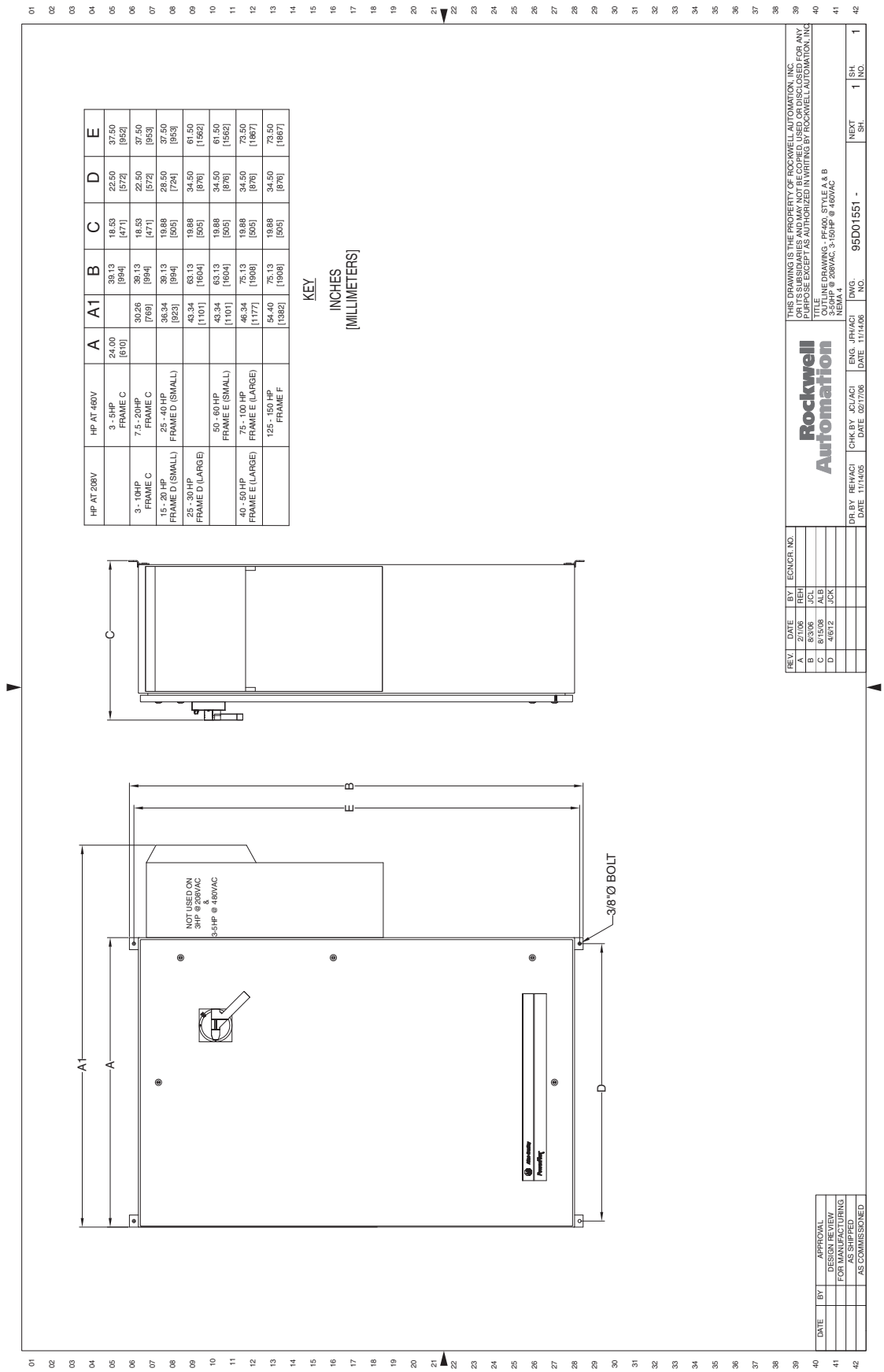
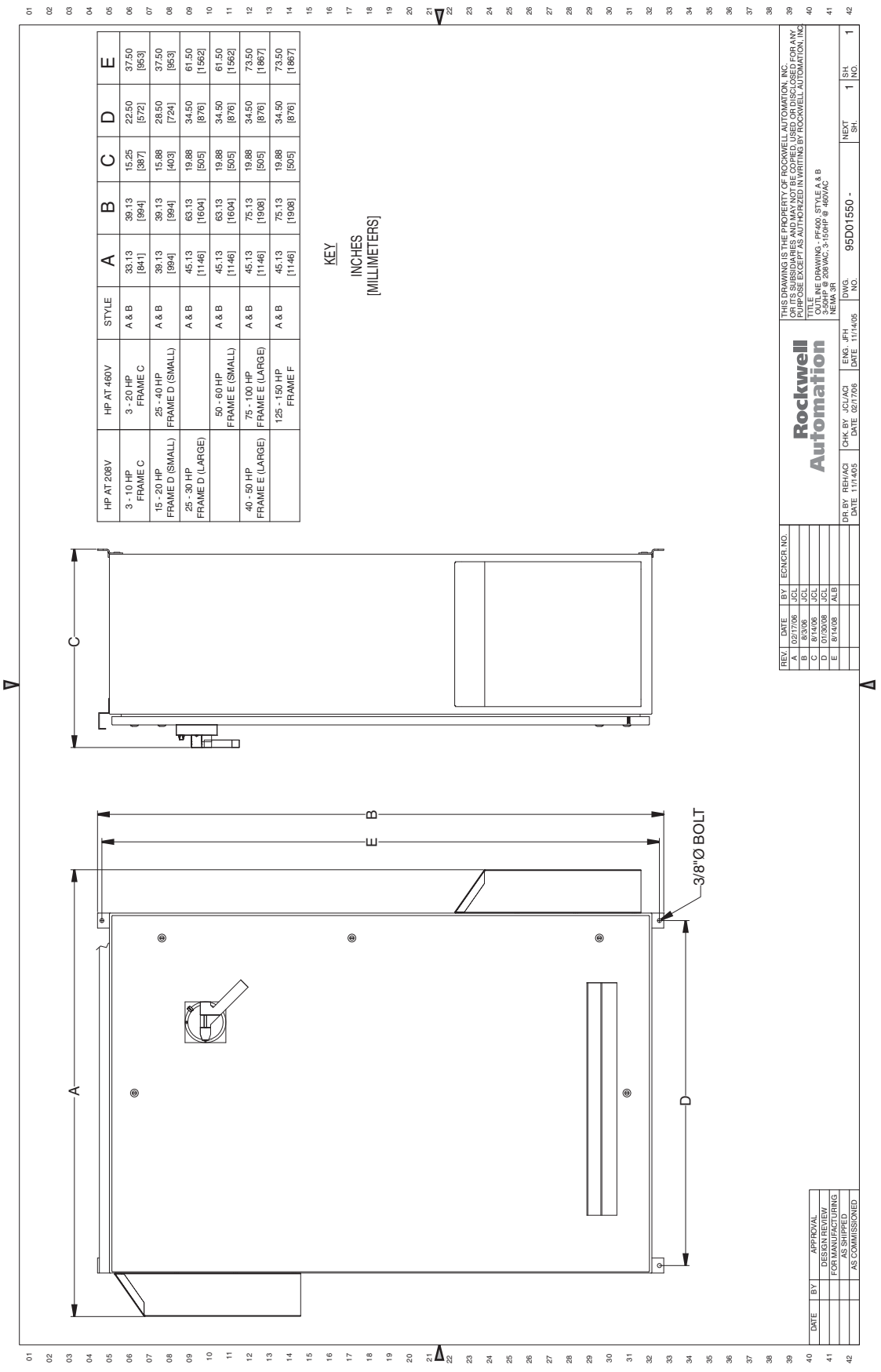


Figure 64 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 4



HP AT 208V	HP AT 460V	A	A1	B	C	D	E
	3 - 5HP FRAME C	24.00 [610]		39.13 [994]	18.53 [471]	22.50 [572]	37.50 [952]
3 - 10HP FRAME C	7.5 - 20HP FRAME C		30.26 [769]	39.13 [994]	18.53 [471]	22.50 [572]	37.50 [953]
15 - 20 HP FRAME D (SMALL)	25 - 40 HP FRAME D (SMALL)		36.34 [923]	39.13 [994]	19.88 [505]	28.50 [724]	37.50 [953]
25 - 30 HP FRAME D (LARGE)			43.34 [1101]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
	50 - 60 HP FRAME E (SMALL)		43.34 [1101]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
40 - 50 HP FRAME E (LARGE)	75 - 100 HP FRAME E (LARGE)		46.34 [1177]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]
	125 - 150 HP FRAME F		54.40 [1382]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]

Figure 65 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 3R



HP AT 208V	HP AT 460V	STYLE	A	B	C	D	E
3 - 10 HP FRAME C	3 - 20 HP FRAME C	A & B	33.13 [841]	39.13 [994]	15.25 [387]	22.50 [572]	37.50 [953]
15 - 20 HP FRAME D (SMALL)	25 - 40 HP FRAME D (SMALL)	A & B	39.13 [994]	39.13 [994]	15.88 [403]	28.50 [724]	37.50 [953]
25 - 30 HP FRAME D (LARGE)		A & B	45.13 [1146]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
	50 - 60 HP FRAME E (SMALL)	A & B	45.13 [1146]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
40 - 50 HP FRAME E (LARGE)	75 - 100 HP FRAME E (LARGE)	A & B	45.13 [1146]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]
	125 - 150 HP FRAME F	A & B	45.13 [1146]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]

REV.	DATE	BY	ECN/CR NO.
A	02/17/06	JCL	
B	8/3/06	JCL	
C	8/14/06	JCL	
D	01/30/08	JCL	
E	8/14/08	ALB	

DR. BY REH/AOJ DATE 1/14/05
CHK. BY JCL/AOJ DATE 02/17/06
ENG. JFH DATE 1/14/05

Rockwell Automation

TITLE
OUTLINE DRAWING - PF400, STYLE A & B
3-50HP @ 208VAC, 3-150HP @ 460VAC
NEMA 3R

DWG. NO. 95D01550 -

NEXT SH. 1

SH. NO. 1

DATE	BY	APPROVAL
		DESIGN REVIEW
		FOR MANUFACTURING
		AS SHIPPED
		AS COMMISSIONED

3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

This chapter describes the features and operation for the 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N).

Style Explanation

- Style B = Fused Disconnect
- Style N = Circuit Breaker

Hardware Overview

The 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N) allows the motor to be manually transferred from drive output to the AC line, or from the AC line to the drive, while the motor is at zero speed. The contactor bypass is electrically interlocked. A means for disconnecting input power via a door interlocked fuse disconnect switch is standard. In addition, this package is supplied with a bypass control interface, which provides status indication and, allows for remote activation of the bypass circuit.

Main Disconnect Switch (DS1)

An Allen-Bradley® Bulletin 194R™ fused disconnect switch with lockable rotary-mounted operator handle is provided. The disconnect switch is designed to meet disconnect switch requirements for branch circuit protection. The door-mounted handle accepts up to three padlocks.

Main Circuit Breakers (CB1)

A circuit breaker with lockable rotary-mounted operator handle is provided. It is important to note that the circuit breaker serves as a disconnect only. Suitable branch circuit protection, such as fuses, need to be provided upstream of the circuit breaker. The door-mounted handle accepts up to three padlocks.

Main Fuses (FU1-FU3)

ATTENTION: Most codes require that upstream branch circuit protection be provided to help protect input power wiring. Install the fuses recommended in Table 5. Do not exceed the fuse ratings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Input line branch circuit protection fuses must be used to help protect the input power lines. If input fuses are not provided with your drive, the recommended fuse values are shown in Table 5. The input fuse ratings that are listed in Table 5 are applicable for one drive per branch circuit. No other load may be applied to that fused circuit.

The recommended fuse type for all PowerFlex® Drives for Fan and Pump Applications is UL Class J, 600V.

Table 5 - Fuse Recommendations

Drive Rating			Fuse Rating
Input Voltage	**kW**	**Hp**	**Amps**
208V AC – 3 Phase	2.2	3.0	20
	3.7	5.0	20
	5.5	7.5	35
	7.5	10	40
	11	15	80
	15	20	100
	18.5	25	125
	22	30	150
	30	40	200
	37	50	250
460V AC – 3 Phase	2.2	3.0	10
	4.0	5.0	15
	5.5	7.5	20
	7.5	10	20
	11	15	35
	15	20	35
	18.5	25	60
	22	30	70
	30	40	80
	37	50	100
	45	60	150
	55	75	175
	75	100	200
	90	125	250
	110	150	350
	132	200	400
	160	250	500
	200	300	600
	250	350	700

Contactors (DIC, DOC, BC)

Allen-Bradley Bulletin 100 Contactors are provided for all ratings. The contactors function as follows:

1. Drive-input contactor (DIC) opens and closes input to the drive.
2. Drive-output contactor (DOC) opens and closes the connection between the drive and the motor.
3. Bypass contactor (BC) opens and closes the connection to line-start the motor.

Motor Overload Relay (OL)

The motor overload relay is set at the factory to 100% of the drive output current. In many cases, this setting matches the motor full load amps (FLA). However, before starting the drive, you should check the setting on the motor overload relay to assure that it is set properly for your motor.

- For motors with a service factor less than 1.15, set the motor overload relays to 0.9x motor FLA.
- For motors with a service factor equal to, or greater than 1.15, set the motor overload relay to the motor FLA.

Figure 66 - Setting Motor Overload

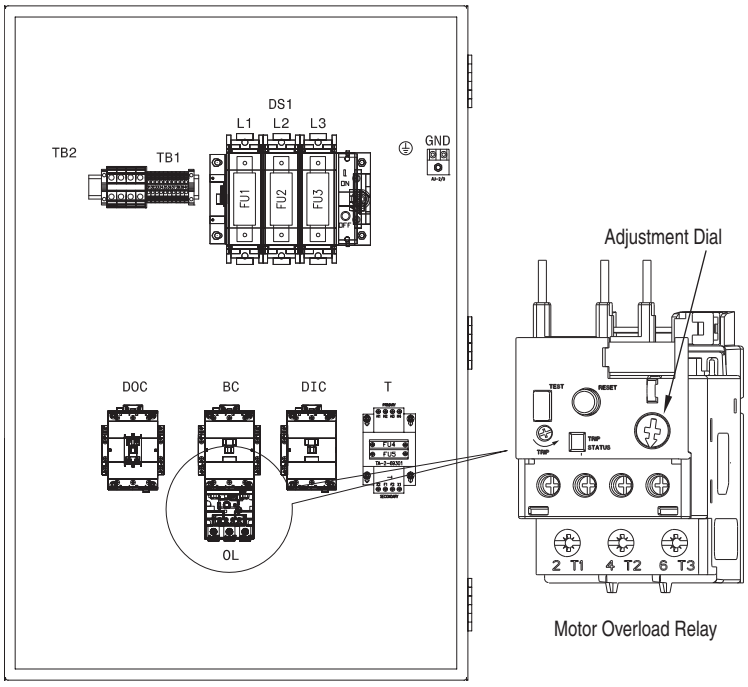


Table 6 - Overload Ratings

Drive Rating			Overload Rating	
Input Voltage	**kW**	**Hp**	**Trip Class**	**Adjustment Rating (Amps)**
208V AC – 3 Phase	2.2	3.0	20	3.2...16
	3.7	5.0	20	5.4...27
	5.5	7.5	20	9...45
	7.5	10	20	9...45
	11	15	20	18...90
	15	20	20	18...90
	18.5	25	20	18...90
	22	30	20	40...200
	30	40	20	40...200
	37	50	20	40...200
460V AC – 3 Phase	2.2	3.0	20	3.2...16
	4.0	5.0	20	3.2...16
	5.5	7.5	20	3.2...16
	7.5	10	20	5.4...27
	11	15	20	9...45
	15	20	20	9...45
	18.5	25	20	9...45
	22	30	20	9...45
	30	40	20	18...90
	37	50	20	18...90
	45	60	20	18...90
	55	75	20	40...200
	75	100	20	40...200
	90	125	20	40...200
	110	150	20	40...200
	132	200	20	100...500
	160	250	20	100...500
	200	300	20	100...500
	250	350	20	100...500

Control Transformer (T1)

115V AC control power is obtained via a supplied control power transformer. The control transformer is fused on the primary.

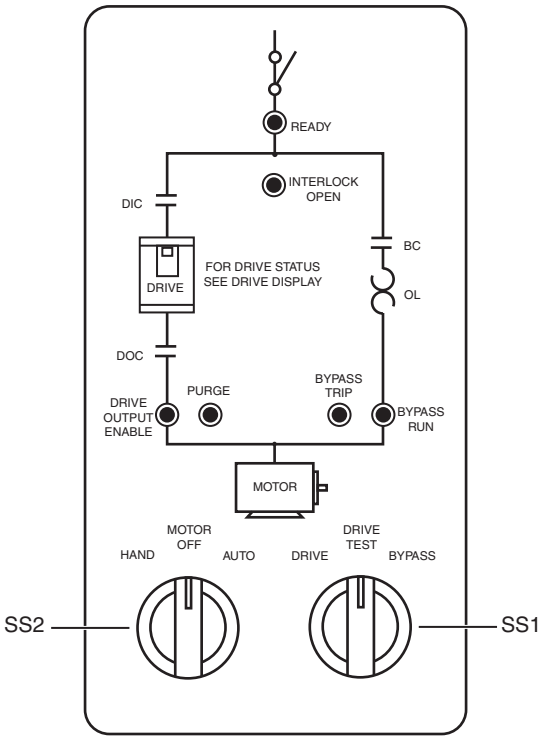
Bypass Control Interface (CP1)

The operator interface on the bypass option box shows the following status indicators:

- Ready (green) - On when power is applied to the drive-bypass unit.
- Interlock Open (amber) - On when the customer interlock or Aux Fault is de-energized.
- Bypass Run (green) - On when the bypass contactor (BC) is energized.
- Bypass Trip (red) - On when a bypass fault condition exists (for example, bypass motor overload has tripped).
- Purge (amber) - On when the purge condition is active.
- Drive Output Enable (Green) - On when the drive output contactor (DOC) is energized.

In addition, the Bypass Control Interface contains two selector switches. Selector Switch 1 (SS1) determines the state of the DIC, DOC, and BC contactors. Selector Switch 2 (SS2) determines the source of control logic.

Figure 67 - Bypass Control Interface



Electrical Installation

Input Power Wiring

Use 75 °C rated copper conductors only for customer power wiring.

See the PowerFlex 400 User Manual, publication 22C-UM001for additional detailed information about input power wiring recommendations and selection.

ATTENTION: Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive package:

❑ 1. Select the proper wire size according to NEC and all applicable local codes and standards. You must punch openings in the Option Cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. Power terminal block specifications are listed in Table 7.

❑ 2. Connect the three-phase AC input power leads (three-wire VAC) to the appropriate terminals. Connect the AC input power leads to terminals L1, L2, L3 on the fused disconnect switch.

❑ 3. Tighten the AC input terminal power terminals to the proper torque according to drive type as shown in Table 7.

Table 7 - AC Input Power Terminal Block Specification

Volts AC	kW	Hp	Maximum Wire Size(1)	Minimum Wire Size	Recommended Torque
208V	2.2…3.7	3.0…5.0	8.4 mm² (8 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	5.5…7.5	7.5…10	16.0 mm² (4 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	11…15	15…20	33.6 mm² (2 AWG)	2.5 mm² (14 AWG)	17.5 N•m (155 lb•in)
	18.5…30	25…40	250 MCM	10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	37	50	350 MCM	35.0 mm² (1/0 AWG)	31.1 N•m (275 lb•in)
460V	2.2…7.5	3.0…10	8.4 mm² (8 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	11…18.5	15…25	16.0 mm² (4 AWG)	2.5 mm² (14 AWG)	4.0 N•m (35 lb•in)
	22…37	30…50	33.6 mm² (2 AWG)	2.5 mm² (14 AWG)	17.5 N•m (155 lb•in)
	45…75	60…100	250 MCM	10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	90…110	125…150	(2) 350 MCM	(2) 10.0 mm² (6 AWG)	31.1 N•m (275 lb•in)
	132	200	(2) 350 MCM	(2) 35.0 mm² (1/0 AWG)	31.1 N•m (275 lb•in)
	160…200	250…300	(2) 350 MCM	(2) 70.0 mm² (3/0 AWG)	31.1 N•m (275 lb•in)
	250	350	(2) 400 MCM	(2) 70.0 mm² (3/0 AWG)	31.1 N•m (275 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

Output Power Wiring

See the PowerFlex 400 User Manual, publication 22C-UM001 for additional detailed information about output power wiring recommendations and selection.

ATTENTION: Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard that is caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC output power wiring from the drive to the motor:

❑ **1.** Wire the three-phase AC output power motor leads by routing them according to the drive option type. You must punch openings in the option cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. Output power terminal block specifications are listed in Table 8.

Do not route more than three sets of motor leads through a conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❑ **2.** Connect the three-phase AC output power motor leads to terminals T1, T2, T3 on the output power terminal block (TB2) located inside the option cabinet.

❑ **3.** Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 8.

Table 8 - Output Power Terminal Block Specification

Volts AC	kW	Hp	Maximum Wire Size(1)	Minimum Wire Size	Recommended Torque
208V	2.2…5.5	3.0…7.5	8.4 mm^2 (8 AWG)	0.5 mm^2 (22 AWG)	1.5 N•m (13 lb•in)
	7.5…15	10…20	16.0 mm^2 (4 AWG)	2.5 mm^2 (14 AWG)	2.3 N•m (20 lb•in)
	18.5…22	25…30	35.0 mm^2 (1/0 AWG)	2.5 mm^2 (14 AWG)	2.5 N•m (22 lb•in)
	30…37	40…50	350 MCM	10.0 mm^2 (6 AWG)	31.1 N•m (275 lb•in)
460V	2.2…5.5	3.0…7.5	8.4 mm^2 (8 AWG)	0.5 mm^2 (22 AWG)	1.5 N•m (13 lb•in)
	7.5…22	10…30	16.0 mm^2 (4 AWG)	2.5 mm^2 (14 AWG)	2.3 N•m (20 lb•in)
	30…55	40…75	35.0 mm^2 (1/0 AWG)	2.5 mm^2 (14 AWG)	2.5 N•m (22 lb•in)
	75	100	350 MCM	10.0 mm^2 (6 AWG)	31.1 N•m (275 lb•in)
	90…110	125…150	350 MCM	10.0 mm^2 (6 AWG)	31.1 N•m (275 lb•in)
	132…160	200…250	300 MCM	107.2 mm^2 (4/0 AWG)	29.4 N•m (260 lb•in)
	200…250	300…350	500 MCM	300 MCM	40.0 N•m (354 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations. If national or local codes require sizes outside the range, lugs may be used.

Control and Signal Wiring

See the PowerFlex 400 User Manual, publication 22C-UM001 for additional detailed information about control and signal wiring.

The Signal Terminal Block (TB1 Terminals 1...20 and R1...R6) on the drive Main Control Board and Control Terminal Block (TB1 Terminals 31...40) located inside the Option Cabinet provide terminals for interfacing customer supplied control inputs and outputs. All analog and discrete control wiring will be made at these terminals. Typical customer control and signal wiring are shown on the Interconnect drawings, Figure 84 on page 117 and Figure 87 on page 120.

To connect control and signal wiring to the drive package:

❑ **1.** Wire the control and signal leads by routing them according to the drive option type. You must punch openings in the option cabinet of the desired conduit size, following NEC, and all applicable local codes and standards. Control and signal terminal block specifications are listed in Table 9.

Control and signal wires should be separated from power wires by at least 0.3 meters (1 foot).

❑ **2.** Connect the analog and relay output signal wiring to terminals 1...20 and R1...R6 on the drive Main Control Board.

❑ **3.** Connect the control wiring listed below to terminals 31...40 located inside the Option Cabinet.

- Interlock
- Freeze/Fire Stats
- Autostart
- Bypass
- Purge
- Bypass Running

❑ **4.** Tighten the control and signal terminals to the proper torque according to drive type as shown in Table 9.

Table 9 - Control and Signal Terminal Block Specifications

Voltage Rating	Terminals	Location	Maximum Wire Size(1)	Minimum Wire Size	Torque
208…460V AC	1…20, R1…R6	Main Control Board	1.3 mm^2 (16 AWG)	0.13 mm^2 (26 AWG)	0.5-0.8 N•m (4.4…7 lb•in)
	31…40	Option Cabinet	4.0 mm^2 (10 AWG)	0.5 mm^2 (22 AWG)	0.6 N•m (5.0 lb•in)

(1) Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

Customer Connections

The 3 Contactor Full Feature Bypass with Disconnect Package is designed to accommodate the following customer supplied contacts. Contacts should be rated for 120V AC.

Interlock

The “Interlock” input functions as an Enable input when operating in either Drive or Bypass mode. Opening of the “Interlock” input (T31-T32) will prevent the drive/motor from running. T31-T32 are shipped jumpered together (with a jumper wire) from the factory. If it is desirable to use the “Interlock” input, this jumper wire can be removed and appropriate customer contacts wired in. If a valid “Autostart” or “Bypass” contact is present, the drive/motor will immediately run upon the closing of the “Interlock” input.

Freeze/Fire Stat

The “Freeze/Fire Stat” input functions as a system fault input when operating in either Drive or Bypass mode. Opening of the “Freeze/Fire Stat” input (T31-T33) will prevent the drive/motor from running. T31-T33 are shipped jumpered together (with a jumper wire) from the factory. If it is desirable to use the “Freeze/Fire Stat” input, the jumper wire can be removed and appropriate customer contacts wired in. If the “Freeze/Fire Stat” input opens while operating in Drive mode, the drive will fault and require a manual reset to restart once the input closes. If the “Freeze/Fire Stat” input opens while operating in Bypass mode, the motor will coast to a stop and immediately run upon the reclosing of the input.

Autostart

The “Autostart” input is used to remotely start the drive when SS1 is in the DRIVE position and SS2 is in the AUTO position. A closed input to terminals 34-35 will start the drive.

Bypass

The “Bypass” input is used to remotely start the motor across the 3-phase AC line when SS1 is in the BYPASS position and SS2 is in the AUTO position. A closed input to terminals 34-36 will start the motor.
See Figure 67 on page 91 for details on selector switch location.

Purge

A "Purge" input can be wired to terminals 37-38. When this input is closed, the motor will run at the Purge Frequency, which is defined by Parameter A141 [Purge Frequency], assuming the following conditions exist.

- SS1 is either in the DRIVE or BYPASS position.
- SS2 is either in the HAND or AUTO position if Jumper P1 on the Bypass Control Panel (CP1) is in position A.
- SS2 is in the HAND, MOTOR OFF, or AUTO position if Jumper P1 on the Bypass Control Panel (CP1) is in Position B.
- Interlock wired to terminals 31-32 is closed.
- Freeze/Fire Stat wired to terminals 31-33 is closed.

ATTENTION: A Purge command will take precedence over a Stop command from the Comm Port/Network. Insure that another stop method is available if stopping is necessary during a purge.

Bypass Running

The "Bypass Running" contact is normally open. When the Bypass Contactor (BC) is closed, the Bypass Running" contact will also be closed.

Operating Modes

Selector Switch 1 (SS1) and Selector Switch 2 (SS2), on the Bypass Control Panel (CP1), are used to determine the operating state of the 3 Contactor Full Feature Bypass with Disconnect Package. SS1 is used to select motor control:

- DRIVE = Drive keypad/terminal block controls the motor
- DRIVE TEST = Drive is powered but is not controlling the motor
- BYPASS = Motor runs across 3-Phase line

Jumper P2 on the Bypass Control Panel (CP1) allows the drive to be powered while running in bypass. This is accomplished by moving Jumper P2 to position B-C and turning SS1 from BYPASS to DRIVE TEST. If Jumper P2 is in position Allen-Bradley, the drive cannot be powered while running in bypass. SS2 selects the source of the Start, Stop, and Drive Speed Reference as defined in Table 10.

Table 10 - Command and Reference Selection

SS1(1) Selection	SS2(1) Selection	Start Command(2)			Stop Command			Drive Speed Reference(3)		
		TB	Keypad	None	TB	Keypad	None	TB	Keypad	None
DRIVE	HAND									
	MOTOR OFF									
	AUTO									
DRIVE TEST	HAND									
	MOTOR OFF									
	AUTO									
BYPASS	HAND	Automatically Starts			Automatically Starts			Motor Runs at Base Speed		
	MOTOR OFF									
	AUTO							Motor Runs at Base Speed		

(1) See Figure 67 on page 91 for details on selector switch location.
(2) When "Auto" is selected, the Start Command is defined by P036 [Start Source]. Factory default is configured for terminal block control. See the PowerFlex 400 User Manual, publication 22C-UM001for other control schemes.
(3) When "Auto" is selected, the Speed Reference is defined by P038 [Speed Reference]. Analog In1 has control by factory default. See the PowerFlex 400 User Manual, publication 22C-UM001 for other control schemes.

Parameter Defaults (Style B/N)

Parameter Name	Number	Default
Output Freq	b001	Read Only
Commanded Freq	b002	Read Only
Output Current	b003	Read Only
Output Voltage	b004	Read Only
DC Bus Voltage	b005	Read Only
Drive Status	b006	Read Only
Fault 1 Code	b007	Read Only
Process Display	b008	Read Only
Output Power	b010	Read Only
Elapsed MWh	b011	Read Only
Elapsed Run Time	b012	Read Only
Torque Current	b013	Read Only
Drive Temp	b014	Read Only
Elapsed kWh	b015	Read Only
Motor NP Volts	P031	Drive Rated Volts
Motor NP Hertz	P032	60 Hz
Motor OL Current	P033	Drive Rated Amps
Minimum Freq	P034	0.0 Hz
Maximum Freq	P035	60 Hz
Start Source	P036	6 "2-W Lvl/Enbl"(1)
Stop Mode	P037	1 "Coast, CF"
Speed Reference	P038	2 "Analog In1"
Accel Time 1	P039	20.00 Secs
Decel Time 1	P040	20.00 Secs
Reset To Defaults	P041	0 "Ready/Idle"
Auto Mode	P042	0 "No Function"(1)
Digital In1 Sel	T051	1 "Purge"
Digital In2 Sel	T052	3 "Local"
Digital In3 Sel	T053	10 "Clear Fault"
Digital In4 Sel	T054	4 "Comm Port"
Relay Out1 Sel	T055	0 "Ready/Fault"
Relay Out1 Level	T056	0.0
Relay 1 On Time	T058	0.0 Secs
Relay 1 Off Time	T059	0.0 Secs
Relay Out2 Sel	T060	2 "MotorRunning"
Relay Out2 Level	T061	0.0
Relay 2 On Time	T063	0.0 Secs
Relay 2 Off Time	T064	0.0 Secs
Opto Out Sel	T065	1 "At Frequency"
Opto Out Level	T066	0.0
Opto Out Logic	T068	0 "Normally Open"
Analog In 1 Sel	T069	2 "0-10V"
Analog In 1 Lo	T070	0.0%
Analog In 1 Hi	T071	100.0%
Analog In 1 Loss	T072	0 "Disabled"
Analog In 2 Sel	T073	1 "4-20 mA"(1)
Analog In 2 Lo	T074	0.0%
Analog In 2 Hi	T075	100.0%
Analog In 2 Loss	T076	0 "Disabled"
Sleep-Wake Sel	T077	0 "Disabled"
Sleep Level	T078	10.0%
Sleep Time	T079	0.0 Secs
Wake Level	T080	15.0%
Wake Time	T081	0.0 Secs
Analog Out1 Sel	T082	0 "OutFreq 0-10"
Analog Out1 High	T083	100%
Analog Out1 Setpt	T084	0.0%
Analog Out2 Sel	T085	1 "OutCurr 0-10"
Analog Out2 High	T086	100%
Analog Out2 Setpt	T087	0.0%
Language	C101	1 "English"
Comm Format	C102	0 "RTU 8-N-1"
Comm Data Rate	C103	3 "9600"
Comm Node Addr	C104	100
Comm Loss Action	C105	0 "Fault"
Comm Loss Time	C106	5.0 Secs
Comm Write Mode	C107	0 "Save"
Purge Frequency	A141	5.0 Hz
Internal Freq	A142	60.00 Hz
Preset Freq 0	A143	0.0 Hz
Preset Freq 1	A144	5.0 Hz
Preset Freq 2	A145	10.0 Hz
Preset Freq 3	A146	20.0 Hz
Accel Time 2	A147	30.00 Secs
Decel Time 2	A148	30.00 Secs
S Curve %	A149	20%
PID Trim Hi	A150	60.0 Hz
PID Trim Lo	A151	0.0 Hz
PID Ref Sel	A152	0 "PID Disabled"
PID Feedback Sel	A153	0 "Analog In 1"
PID Prop Gain	A154	0.01
PID Integ Time	A155	2.0 Secs
PID Diff Rate	A156	0.00
PID Setpoint	A157	0.0%
PID Deadband	A158	0.0%
PID Preload	A159	0.0 Hz
Process Factor	A160	30.0
Auto Rstrt Tries	A163	0
Auto Rstrt Delay	A164	1.0 Secs
Start At PowerUp	A165	1 "Enabled"(1)
Reverse Disable	A166	1 "Rev Disabled"
Flying Start En	A167	1 "Enabled"(1)
PWM Frequency	A168	4.0 kHz
PWM Mode	A169	1 "2-Phase"
Boost Select	A170	4 "45.0, VT"
Start Boost	A171	2.5%
Break Voltage	A172	25.0%
Break Frequency	A173	15.0 Hz
Maximum Voltage	A174	Drive Rated Volts
Slip Hertz @ FLA	A175	2.0 Hz
DC Brake Time	A176	0.0 Secs
DC Brake Level	A177	Drive Rated Amps
DC Brk Time@Strt	A178	0 (Disabled)
Current Limit 1	A179	Drive Rated Amps
Current Limit 2	A180	Drive Rated Amps
Motor OL Select	A181	0 "No Derate"
Drive OL Mode	A182	3 "Both-PWM 1st"
SW Current Trip	A183	0.0 (Disabled)
Load Loss Level	A184	0.0 (Disabled)
Load Loss Time	A185	0 Secs
Stall Fault Time	A186	0 "60 Seconds"
Bus Reg Mode	A187	1 "Enabled"
Skip Frequency 1	A188	0 Hz
Skip Freq Band 1	A189	0.0 Hz
Skip Frequency 2	A190	0 Hz
Skip Freq Band 2	A191	0.0 Hz
Skip Frequency 3	A192	0 Hz
Skip Freq Band 3	A193	0.0 Hz
Compensation	A194	1 "Electrical"
Reset Meters	A195	0 "Ready/Idle"
Testpoint Sel	A196	400
Fault Clear	A197	0 "Ready/Idle"
Program Lock	A198	0 "Unlocked"
Motor NP Poles	A199	4
Relay Out3 Sel	R221	0 "Ready/Fault"
Relay Out3 Level	R222	0.0
Relay Out4 Sel	R224	0 "Ready/Fault"
Relay Out4 Level	R225	0.0
Relay Out5 Sel	R227	0 "Ready/Fault"
Relay Out5 Level	R228	0.0
Relay Out6 Sel	R230	0 "Ready/Fault"
Relay Out6 Level	R231	0.0
Relay Out7 Sel	R233	0 "Ready/Fault"
Relay Out7 Level	R234	0.0
Relay Out8 Sel	R236	0 "Ready/Fault"
Relay Out8 Level	R237	0.0
Aux Motor Mode	R239	0 "Disabled"
Aux Motor Qty	R240	1 "1 Aux Mtr"
Aux 1 Start Freq	R241	50.0 Hz
Aux 1 Stop Freq	R242	25.0 Hz
Aux 1 Ref Add	R243	0.0%
Aux 2 Start Freq	R244	50.0 Hz
Aux 2 Stop Freq	R245	25.0 Hz
Aux 2 Ref Add	R246	0.0%
Aux 3 Start Freq	R247	50.0 Hz
Aux 3 Stop Freq	R248	25.0 Hz
Aux 3 Ref Add	R249	0.0%
Aux Start Delay	R250	5.0 Secs
Aux Stop Delay	R251	3.0 Secs
Aux Prog Delay	R252	0.50 Secs
Aux AutoSwap Tme	R253	0.0 Hr
Aux AutoSwap Lvl	R254	50.0%
Control Source	d301	Read Only
Contrl In Status	d302	Read Only
Comm Status	d303	Read Only
PID Setpnt Displ	d304	Read Only
Analog In 1	d305	Read Only
Analog In 2	d306	Read Only
Fault 1 Code	d307	Read Only
Fault 2 Code	d308	Read Only
Fault 3 Code	d309	Read Only
Fault 1 Time-hr	d310	Read Only
Fault 1 Time-min	d311	Read Only
Fault 2 Time-hr	d312	Read Only
Fault 2 Time-min	d313	Read Only
Fault 3 Time-hr	d314	Read Only
Fault 3 Time-min	d315	Read Only
Elapsed Time-hr	d316	Read Only
Elapsed Time-min	d317	Read Only
Output Powr Fctr	d318	Read Only
Testpoint Data	d319	Read Only
Control SW Ver	d320	Read Only
Drive Type	d321	Read Only
Output Speed	d322	Read Only
Output RPM	d323	Read Only
Fault Frequency	d324	Read Only
Fault Current	d325	Read Only
Fault Bus Volts	d326	Read Only
Status @ Fault	d327	Read Only

(1) The default values of these parameters differ from Factory Defaults. Setting P041 [Reset To Defaults] to 1 "Factory Reset" will change these parameter settings to the defaults listed in the PowerFlex 400 User Manual, publication 22C-UM001.

ATTENTION: Parameter A165 [Start At PowerUp] ships from the factory enabled. This feature allows a Run command to automatically cause the drive to resume running at commanded speed after drive input power is restored. Equipment damage and/or personal injury may result if this parameter is used in an inappropriate application. Do not use this function without considering applicable local, national, and international codes, standards, regulations or industry guidelines.

Drawing Index

208V AC – 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

Input Voltage	Type	Hp	Input Line Reactor	Drawing								HP	Style
				SchematicPage		InterconnectPage		LayoutPage		OutlinePage			
208V AC	NEMA/UL Type 1	3	No	98D00705	101	97D00704	117	95D00761	122	95D00719	159	3	B
		5										5	
		7.5						95D00762	123	95D00698	160	7.5	
		10										10	
		15						95D00763	124	95D00700	161	15	
		20										20	
		25						95D00777	125	95D00701	162	25	
		30										30	
		40						95D00765	127	95D00702	163	40	
		50						95D00778	128	95D00703	164	50	
		3	Yes	98D00757	107	97D00755	120	95D00793	132	95D00720	168	3	
		5										5	
		7.5						95D00794	133	95D00699	169	7.5	
		10										10	
		15						95D01371	134	95D01363	170	15	
		20										20	
		25						95D01372	135	95D01364	171	25	
		30						95D01377	136			30	
		40						95D01374	138	95D01366	173	40	
		50										50	
	NEMA/UL Type 12	3	With or Without	98D01541	109	97D01549	121	95D01580	139	95D01552	174	3	B & N
		5										5	
		7.5										7.5	
		10										10	
		15						95D01581	140			15	
		20										20	
		25						95D01582	141			25	
		30										30	
		40						95D01583	142			40	
		50										50	
	NEMA/UL Type 4	3	With or Without	98D01539	111	97D01549	121	95D01569	145	95D01551	175	3	
		5										5	
		7.5										7.5	
		10										10	
		15						95D01571	146			15	
		20										20	
		25						95D02456	147			25	
		30										30	
		40						95D02496	148			40	
		50										50	
	NEMA/UL Type 3R	3	With or Without	98D01536	115	97D01549	121	95D01558	152	95D01550	176	3	
		5										5	
		7.5										7.5	
		10										10	
		15						95D01559	153			15	
		20										20	
		25						95D01560	154			25	
		30										30	
		40						95D02494	155			40	
		50										50	

460V AC – 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

Input Voltage	Type	Hp	Input Line Reactor	Drawing								Hp	Style
				Schematic	Page	Interconnect	Page	Layout	Page	Outline	Page		
460V AC	NEMA/UL Type 1	3	No	98D00705	101	97D00704	117	95D00761	122	95D00719	159	3	B
		5										5	
		7.5										7.5	
		10										10	
		15						95D00762	123	95D00698	160	15	
		20										20	
		25						95D00763	124	95D00700	161	25	
		30										30	
		40										40	
		50						95D00764	126	95D00702	163	50	
		60										60	
		75										75	
		100						95D00765	127			100	
		125						95D01263	129	95D01265	165	125	
		150										150	
		200		98D01861	103	97D01892	118	95D01863	130	95D01867	166	200	
		250		98D01860	105	97D01891	119					250	N
		300						95D01865	131	95D01869	167	300	
		350										350	
		3	Yes	98D00757	107	97D00755	120	95D00793	132	95D00720	168	3	B
		5										5	
		7.5										7.5	
		10										10	
		15						95D00794	133	95D00699	169	15	
		20										20	
		25						95D01371	134	95D01363	170	25	
		30										30	
		40										40	
		50						95D01373	137	95D01365	172	50	
		60										60	
		75						95D01374	138	95D01366	173	75	
		100										100	
	NEMA/UL Type 12	3	With or Without	98D01541	109	97D01549	121	95D01580	139	95D01552	174	3	B & N
		5										5	
		7.5										7.5	
		10										10	
		15										15	
		20										20	
		25						95D01581	140			25	
		30										30	
		40										40	
		50						95D01582	141			50	
		60										60	
		75						95D01583	142			75	
		100										100	
		125						95D01584	143			125	
		150										150	

Input Voltage	Type	Hp	Input Line Reactor	Drawing								Hp	Style
				Schematic	Page	Interconnect	Page	Layout	Page	Outline	Page		
460V AC	NEMA/UL Type 4	3	With or Without	98D01539	111	97D01549	121	95D02443	144	95D01551	175	3	B & N
		5										5	
		7.5						95D01569	145			7.5	
		10										10	
		15										15	
		20										20	
		25						95D01571	146			25	
		30										30	
		40										40	
		50						95D02472	149			50	
		60										60	
		75						95D02478	150			75	
		100										100	
		125		98D01540	113			95D01574	151			125	
		150										150	
	NEMA/UL Type 3R	3	With or Without	98D01536	115	97D01549	121	95D01558	152	95D01550	176	3	
		5										5	
		7.5										7.5	
		10										10	
		15										15	
		20										20	
		25						95D01559	153			25	
		30										30	
		40										40	
		50						95D02471	156			50	
		60										60	
		75						95D02477	157			75	
		100										100	
		125						95D01562	158			125	
		150										150	

Schematic Drawings

Figure 68 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1

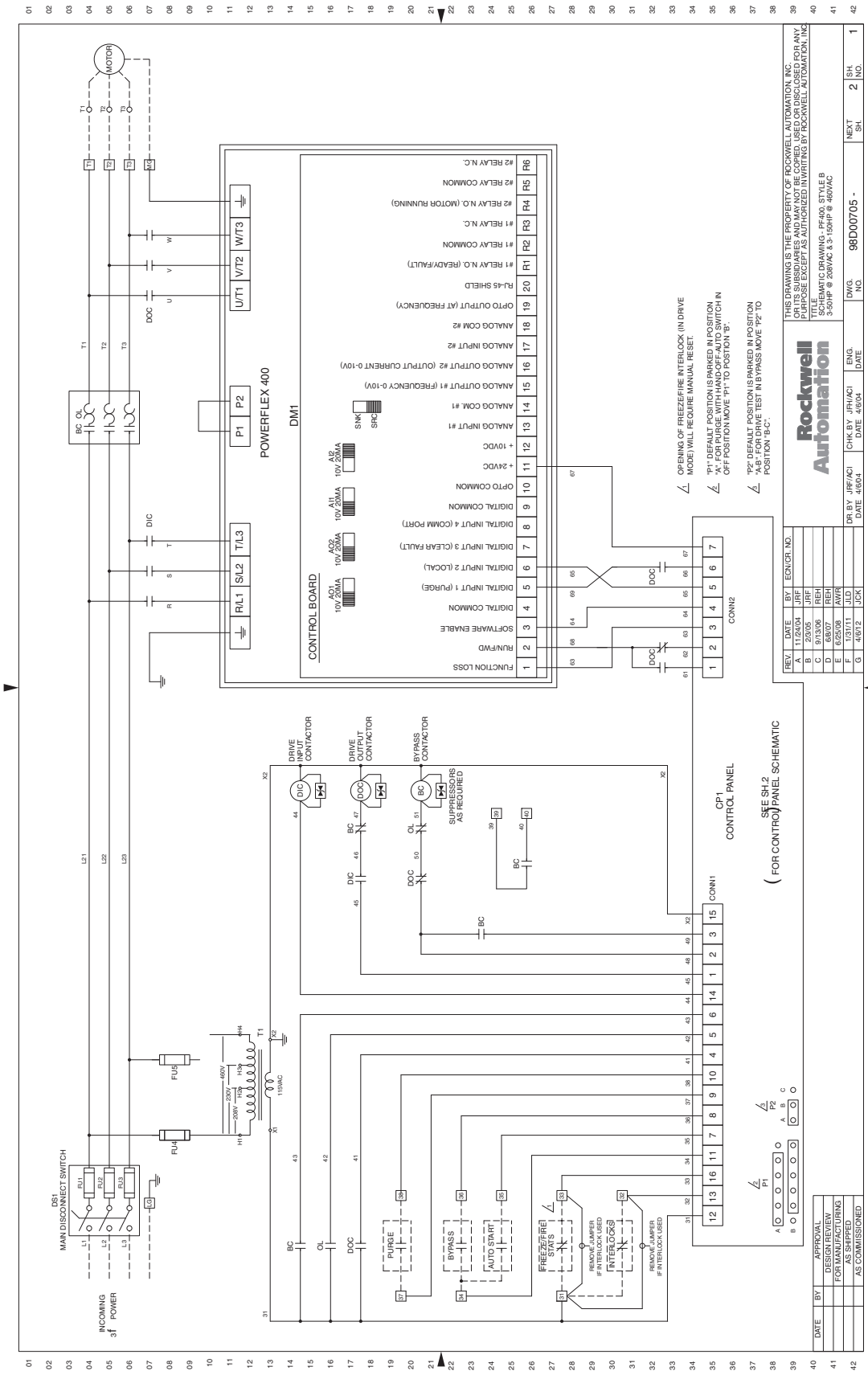


Figure 69 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1

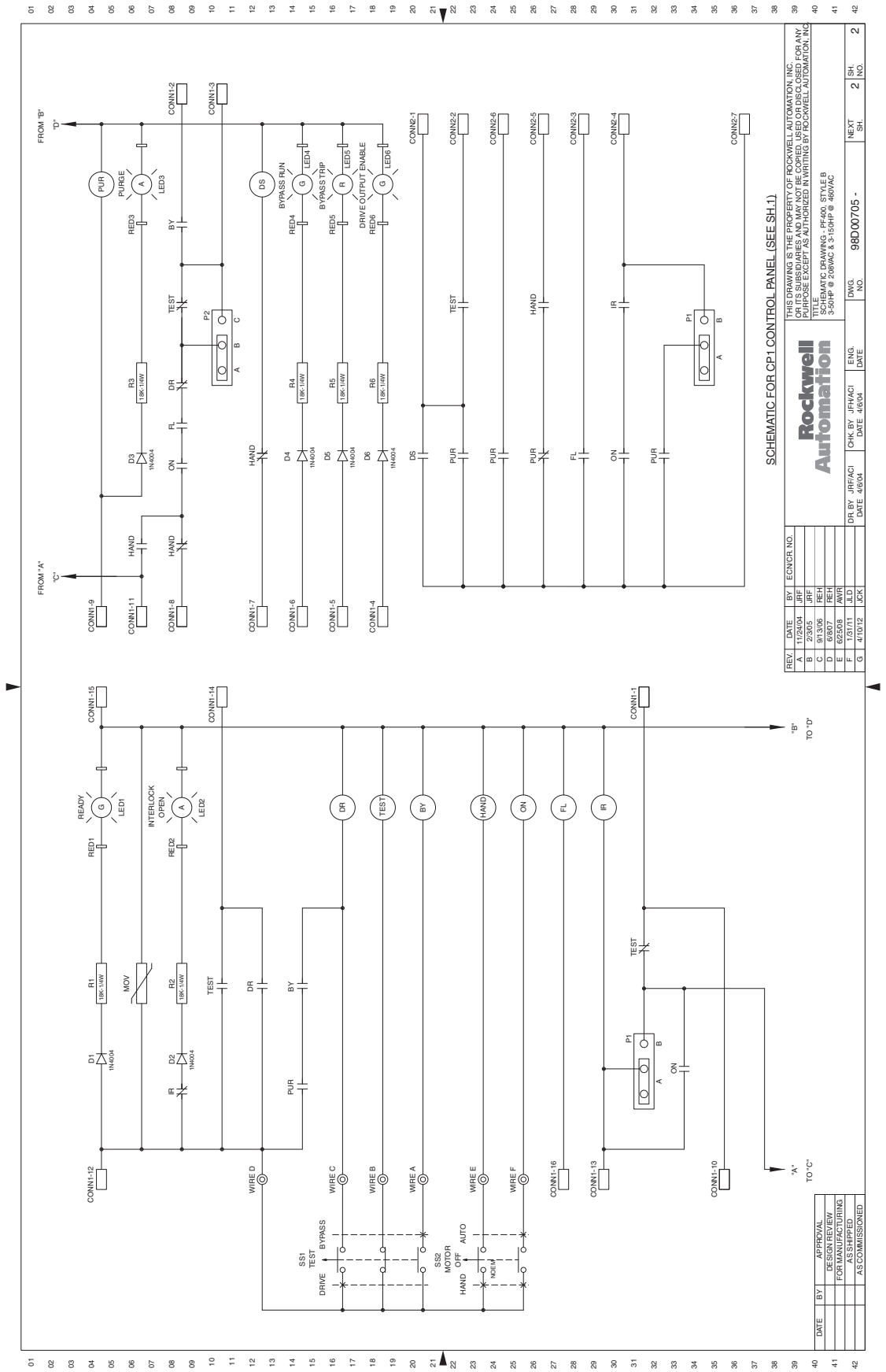


Figure 70 - 200 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1

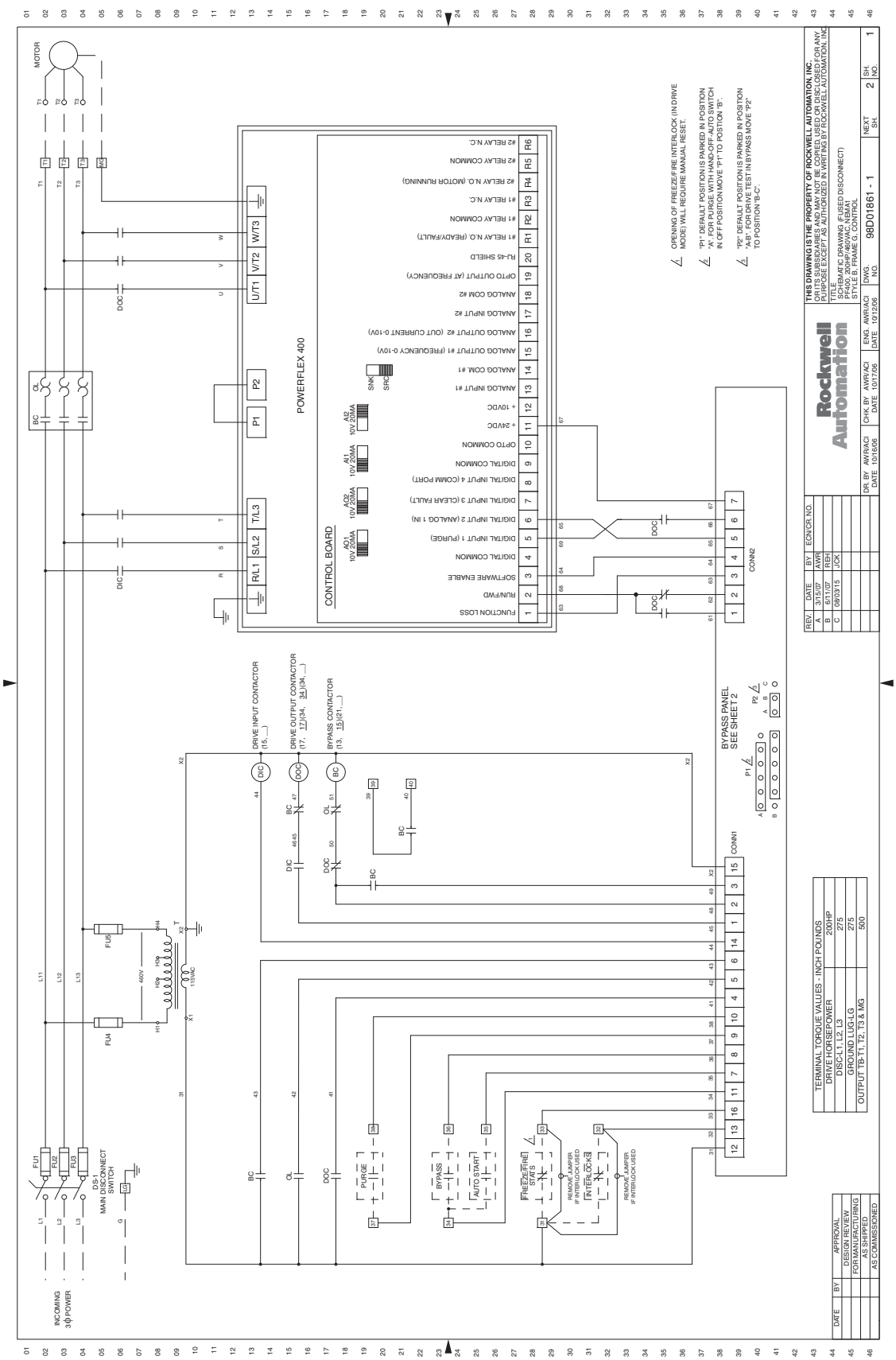


Figure 71 - 200 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1

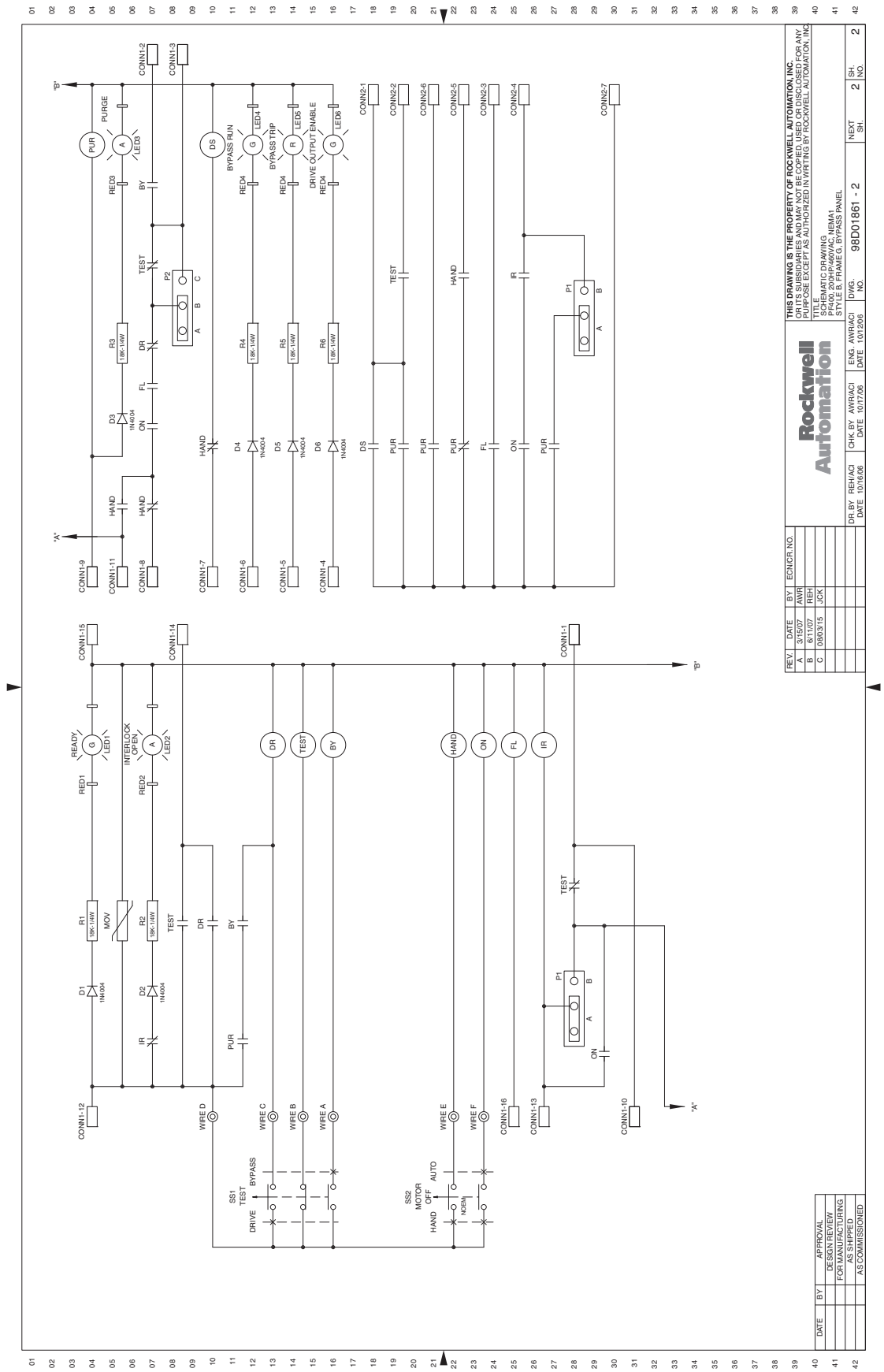


Figure 72 - 250…350 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1

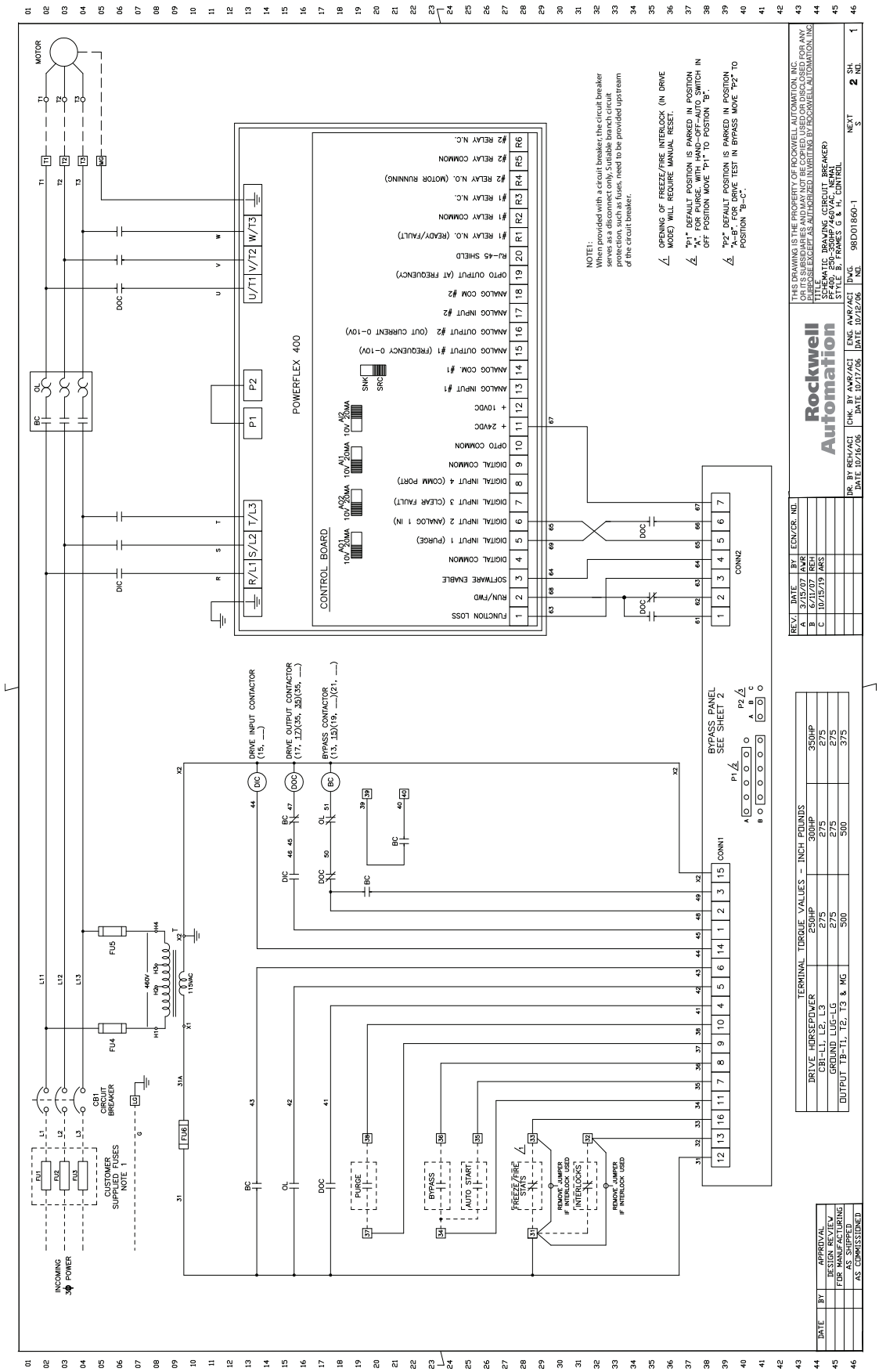


Figure 73 - 250…350 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1

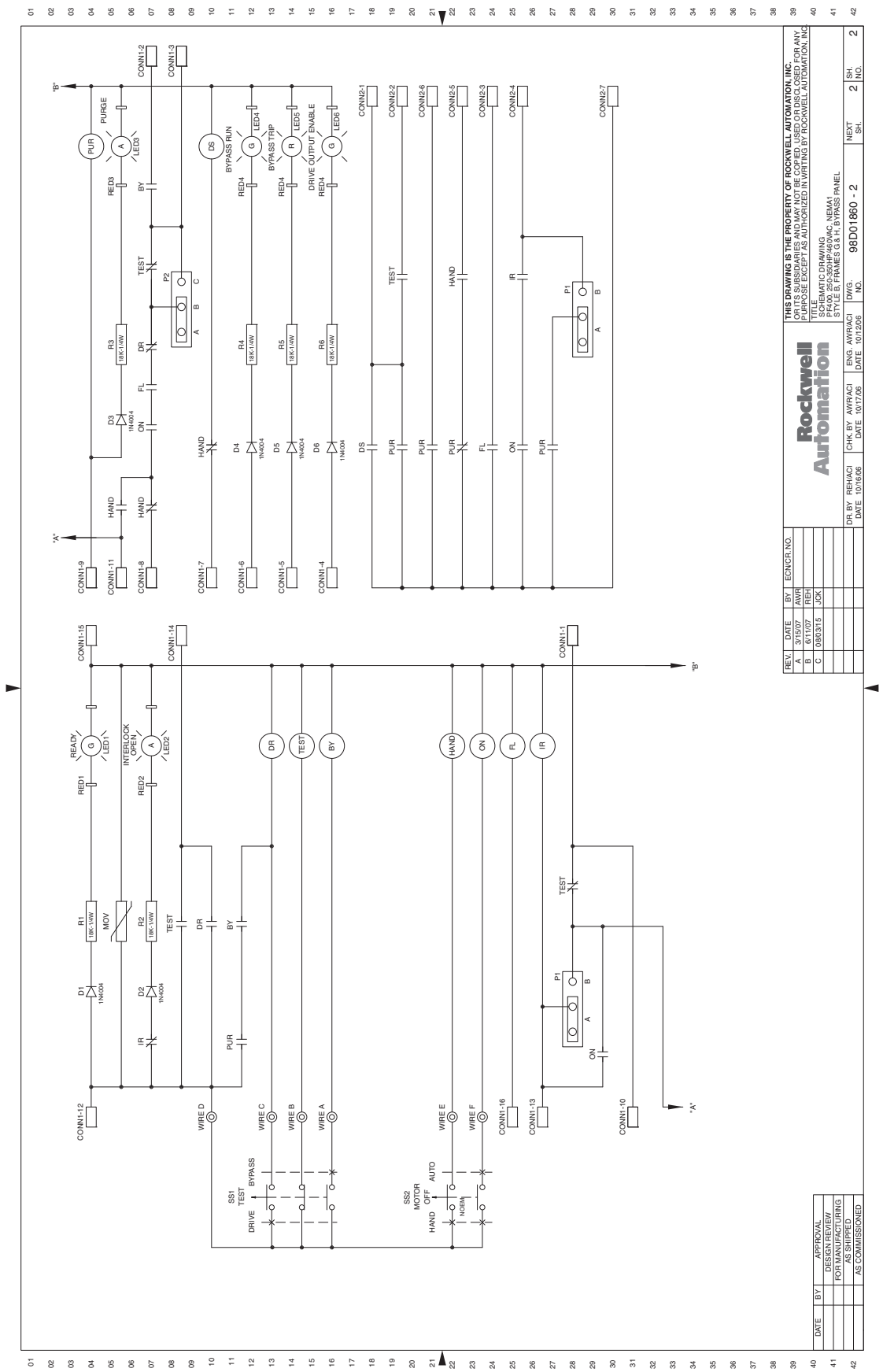


Figure 74 - 3.0…50 Hp, 208V AC and 3.0…100 Hp, 460V AC Drives with Line Reactor (Sheet 1 of 2) - NEMA/UL Type 1

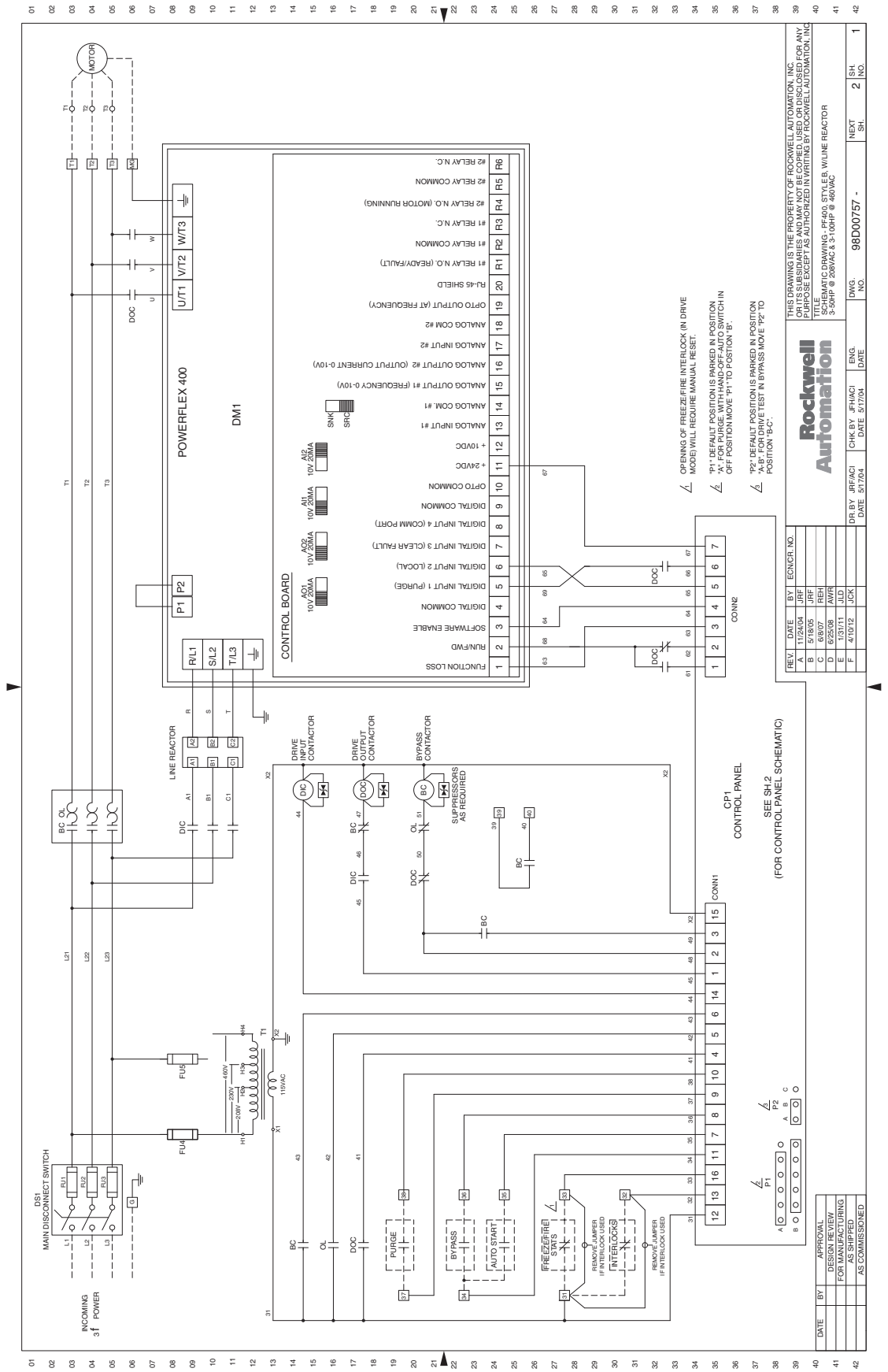


Figure 75 - 3.0…50 Hp, 208V AC and 3.0…100 Hp, 460V AC Drives with Line Reactor (Sheet 2 of 2) - NEMA/UL Type 1

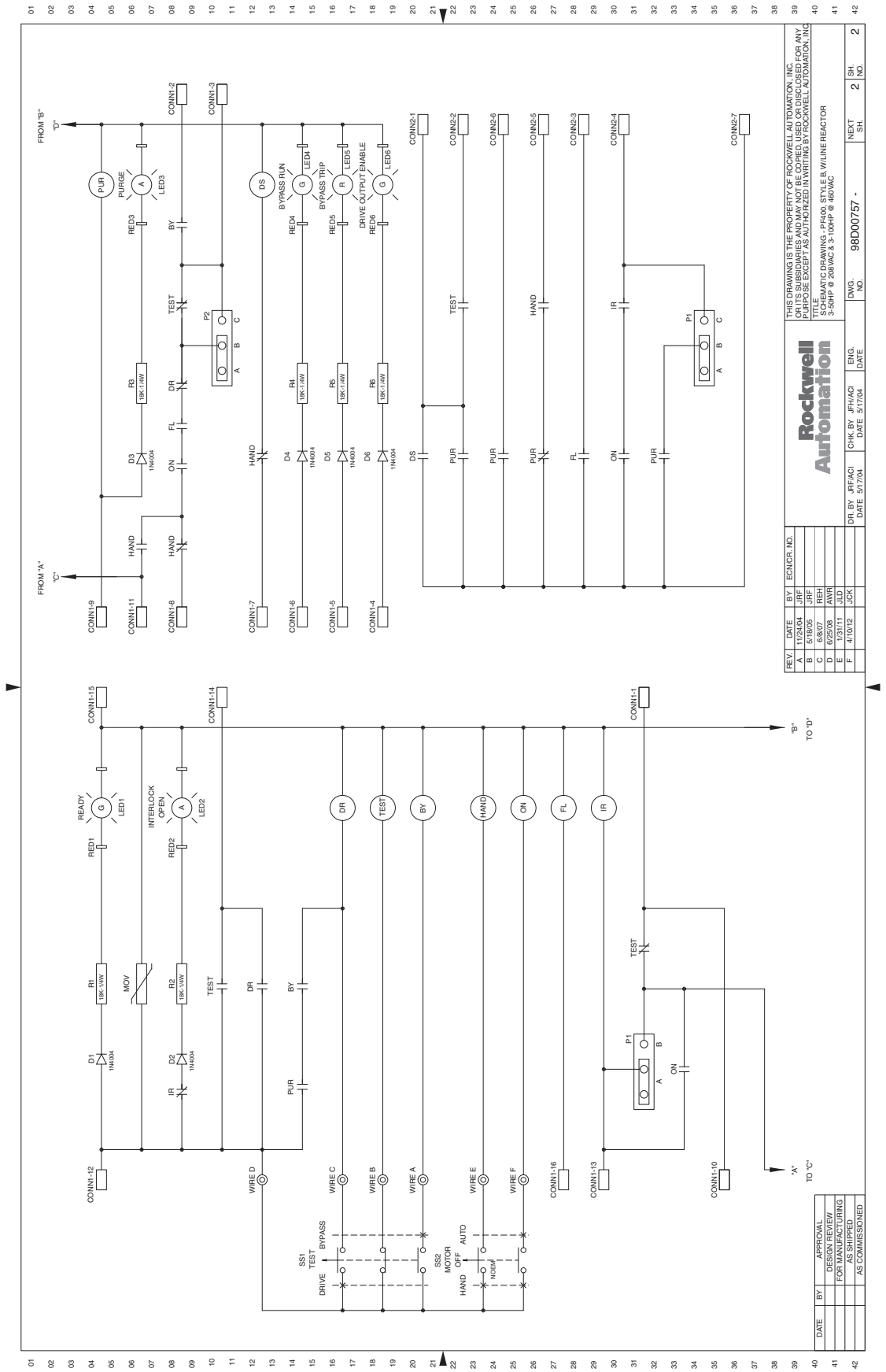


Figure 76 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 12

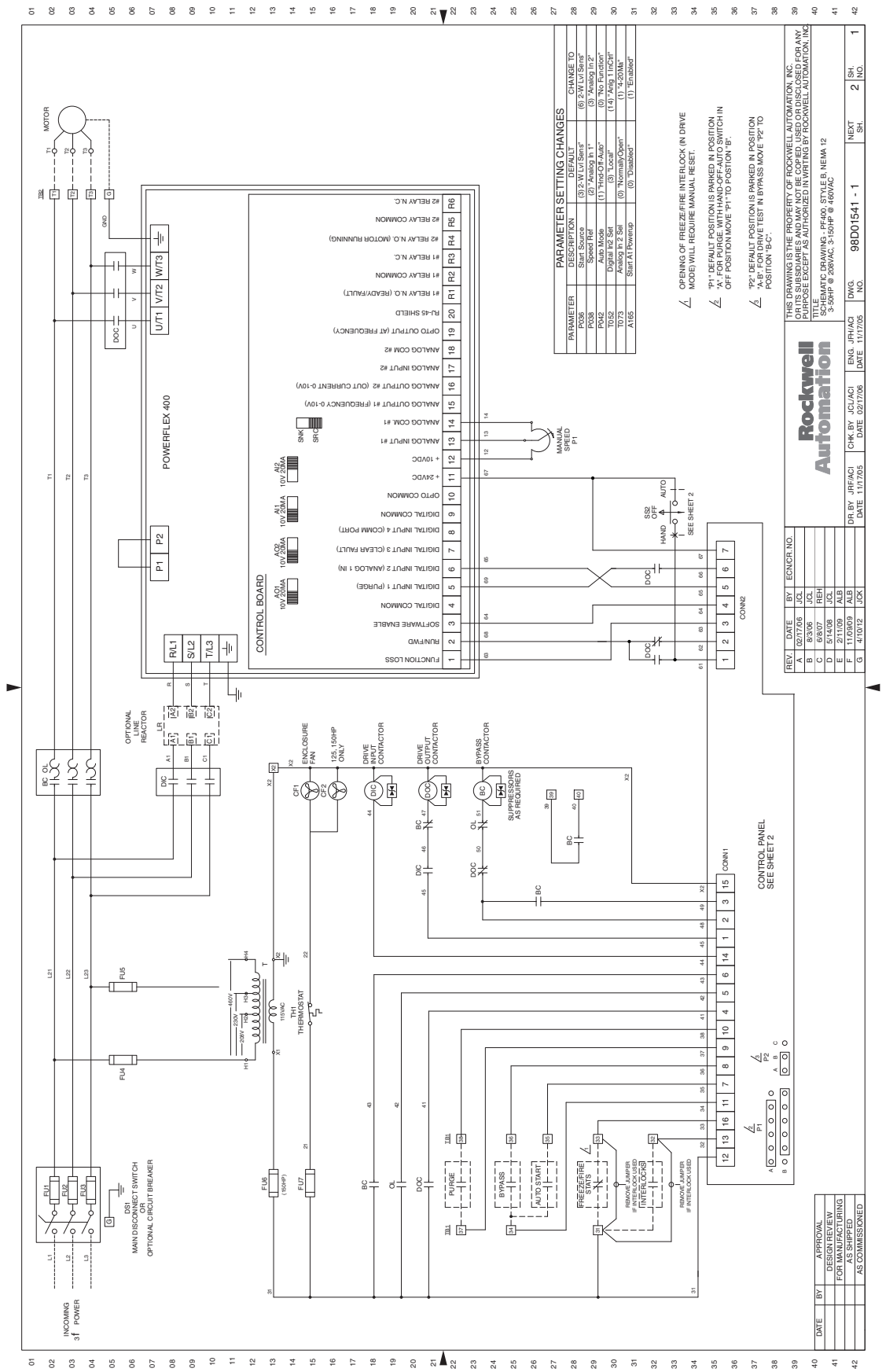


Figure 77 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 12

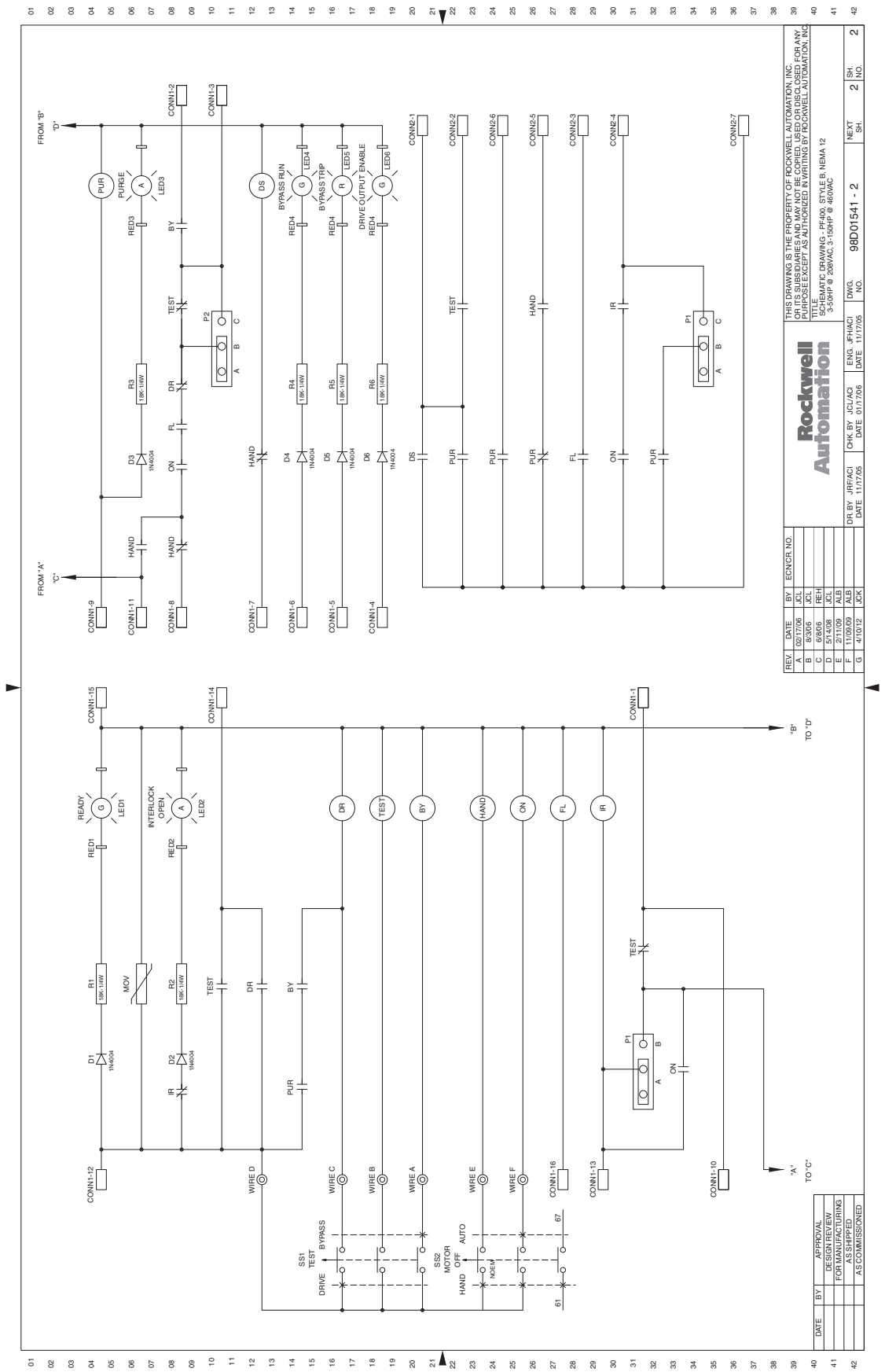


Figure 78 - 3.0…50 Hp, 208V AC and 3.0…100 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 4

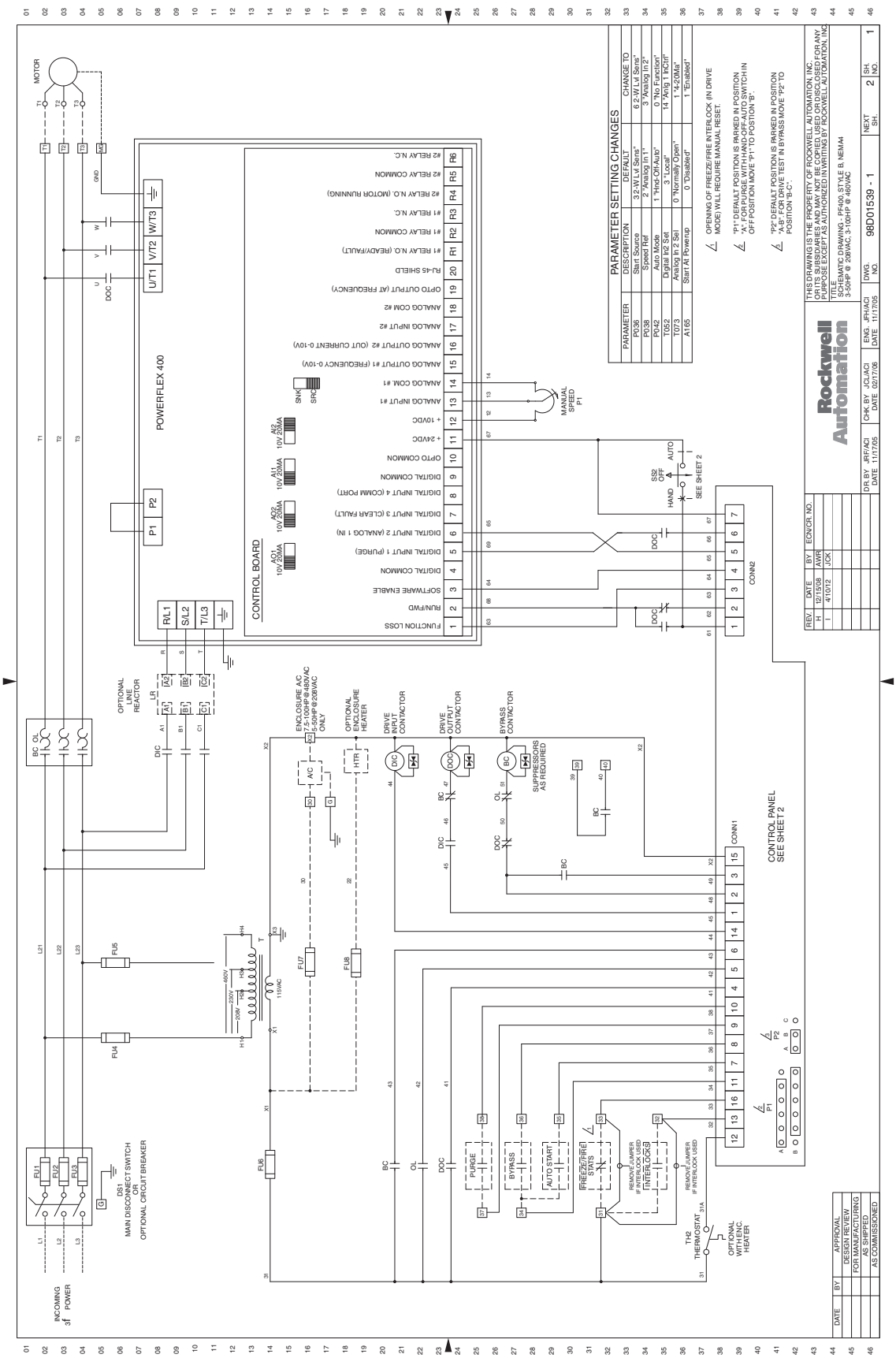


Figure 79 - 3.0…30 Hp, 208V AC and 3.0…40 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 4

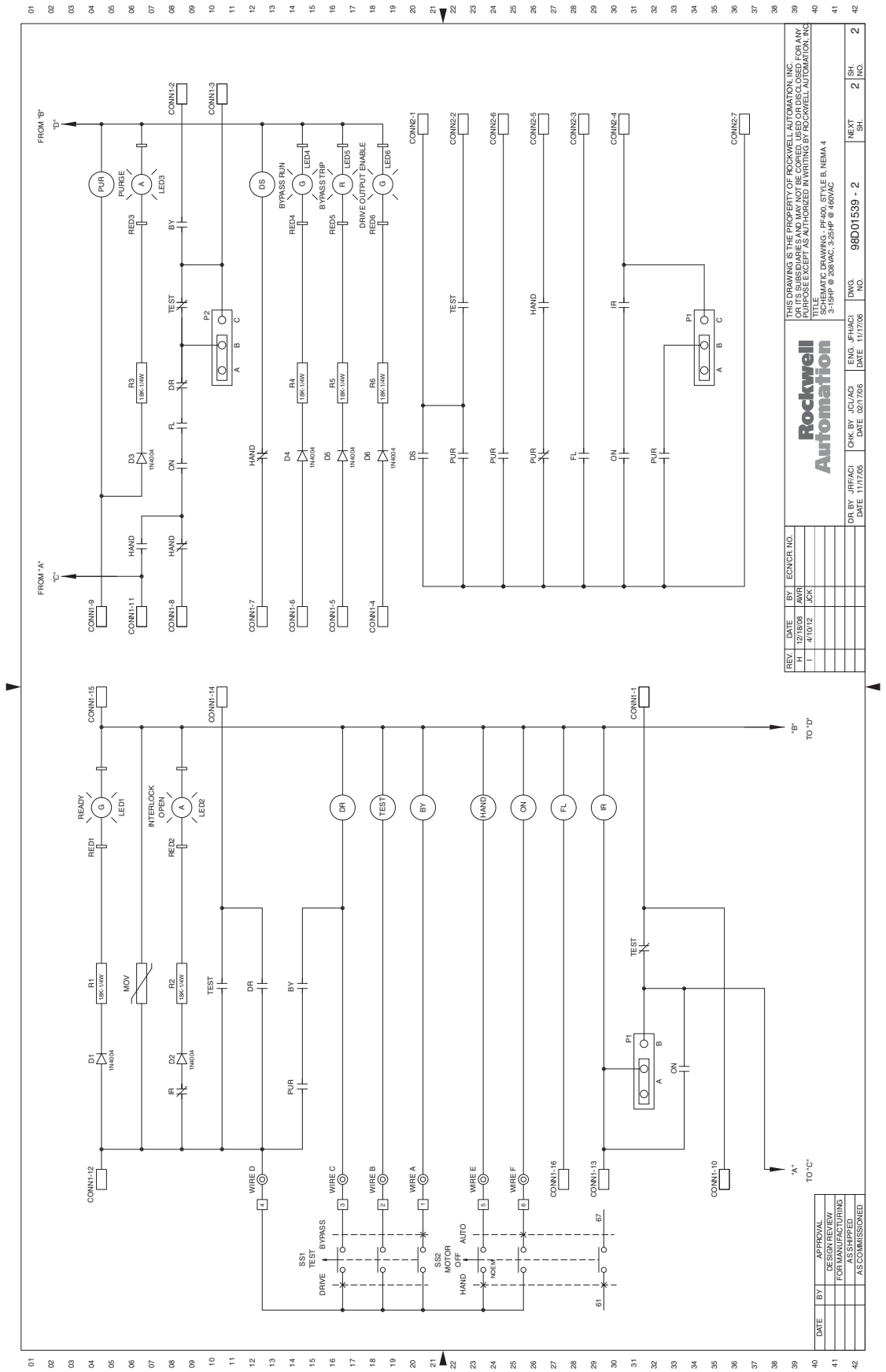


Figure 80 - 125…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 4

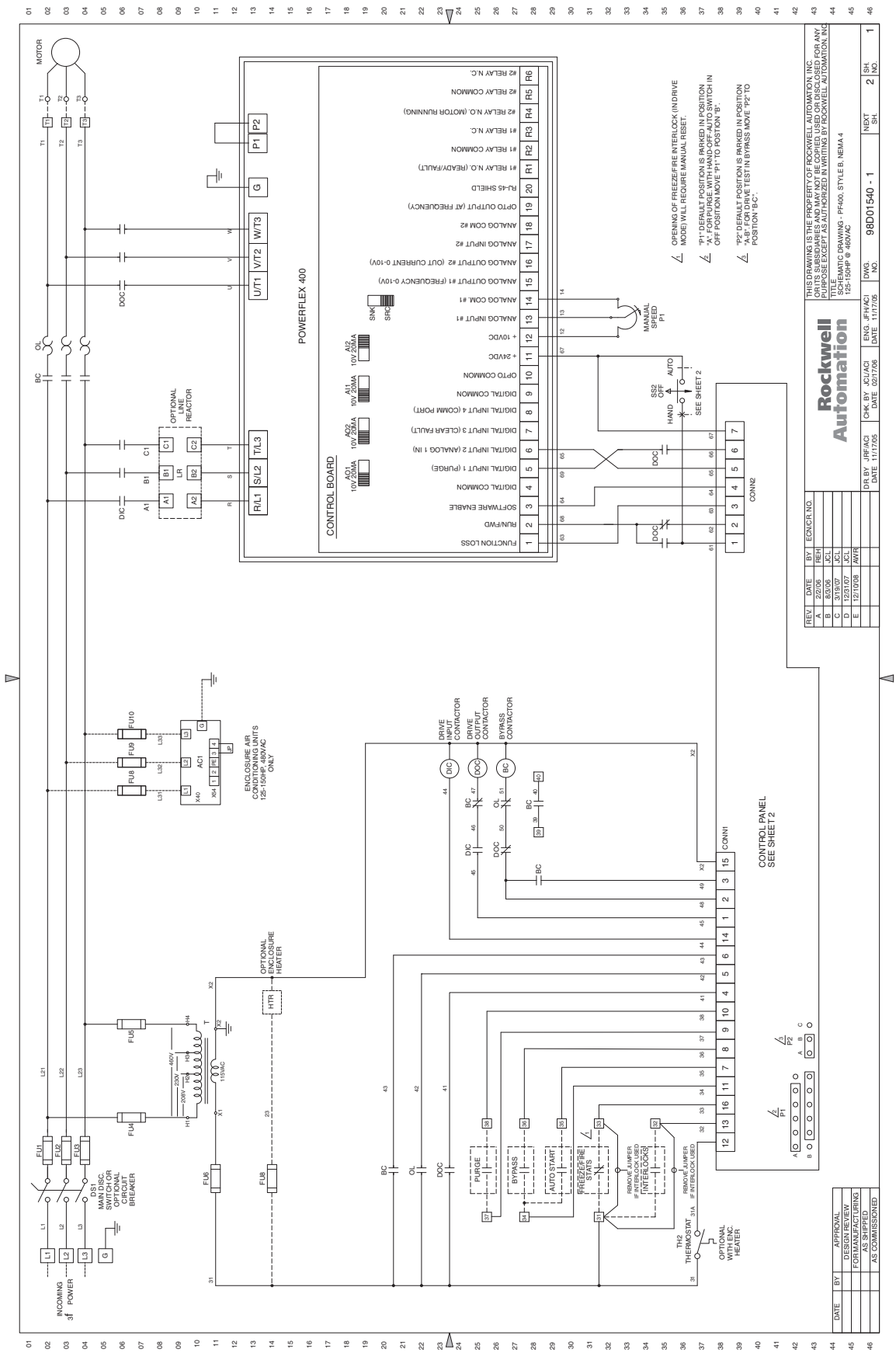


Figure 81 - 125…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 4

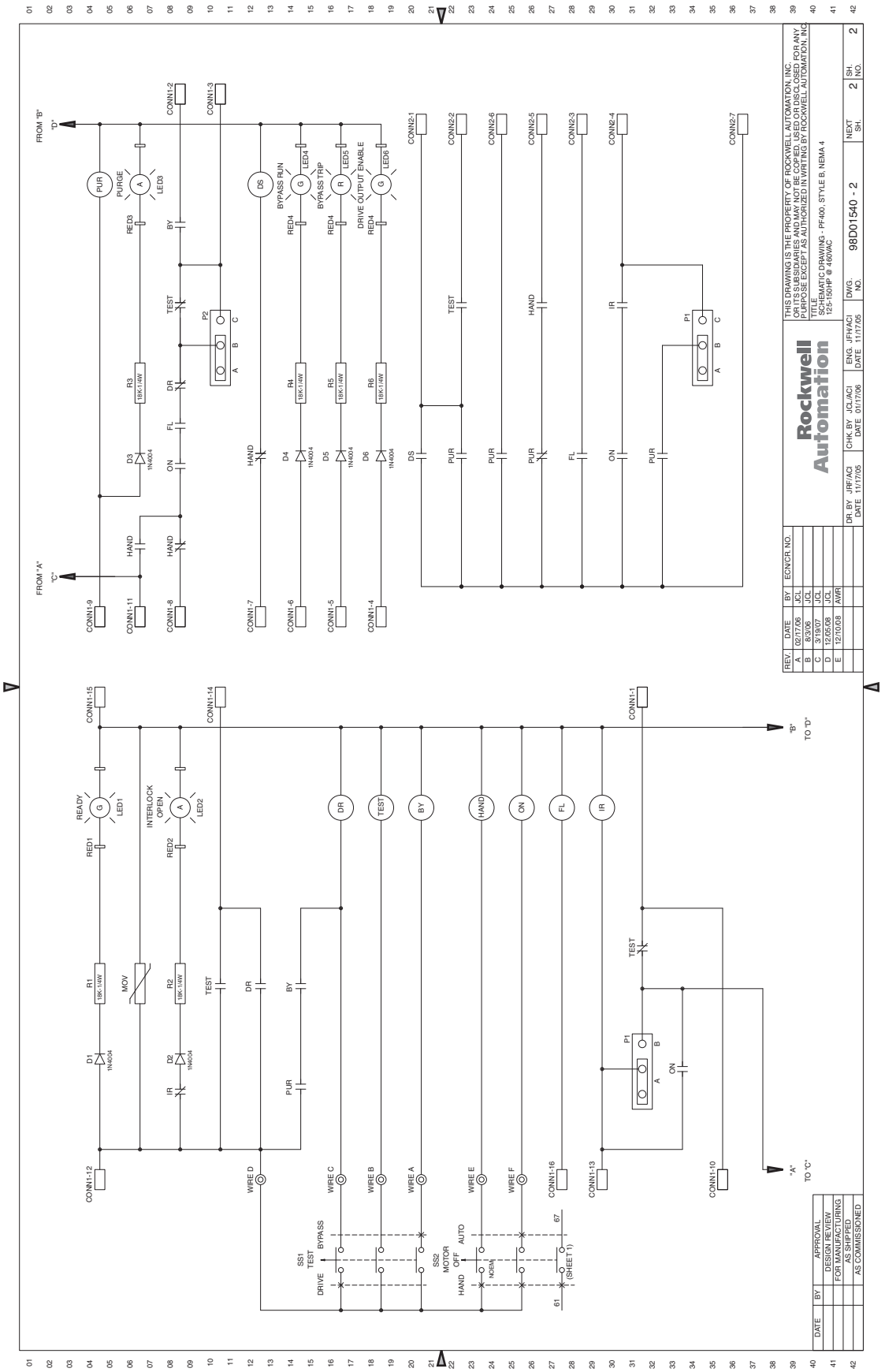


Figure 82 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 3R

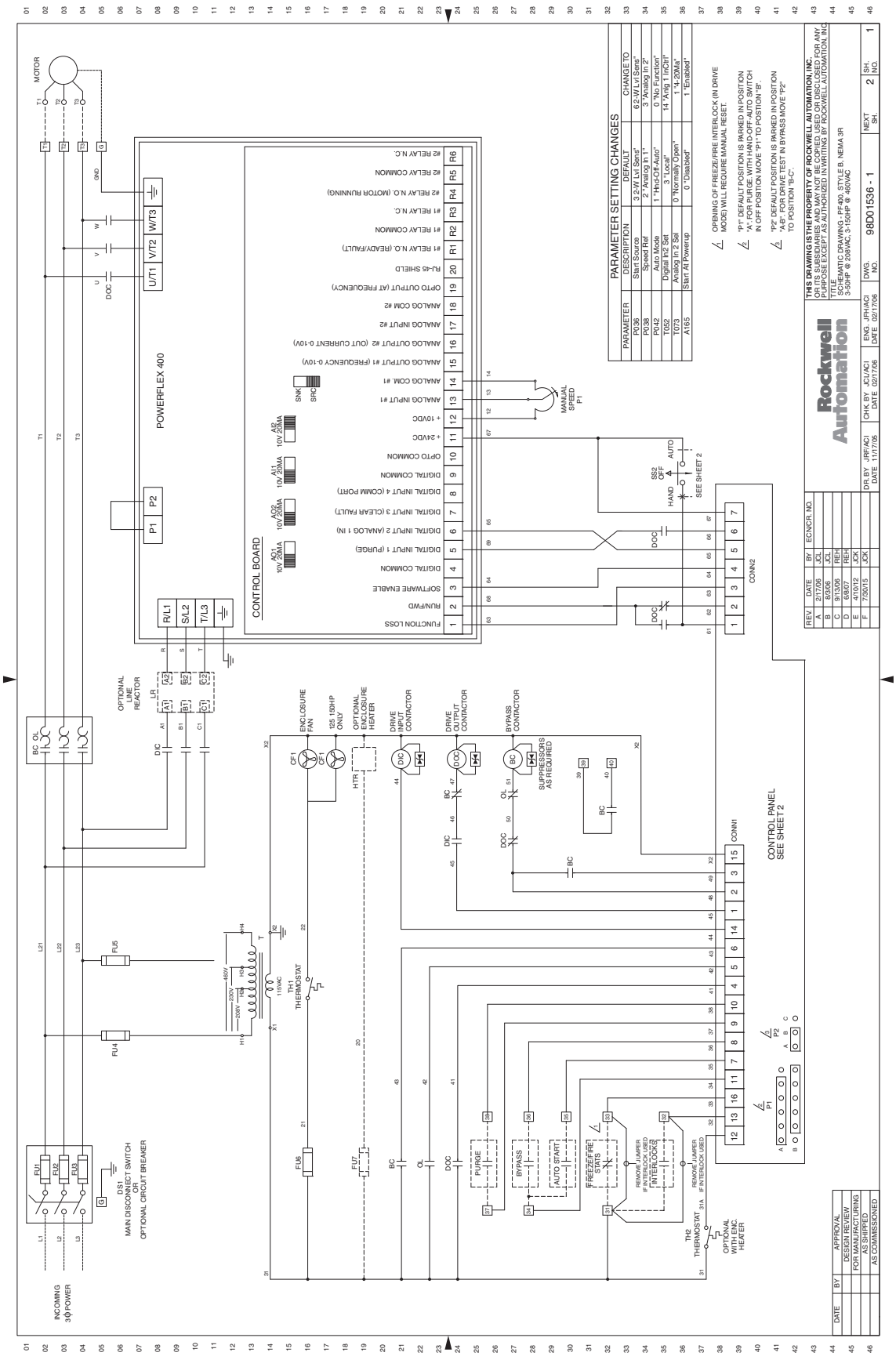
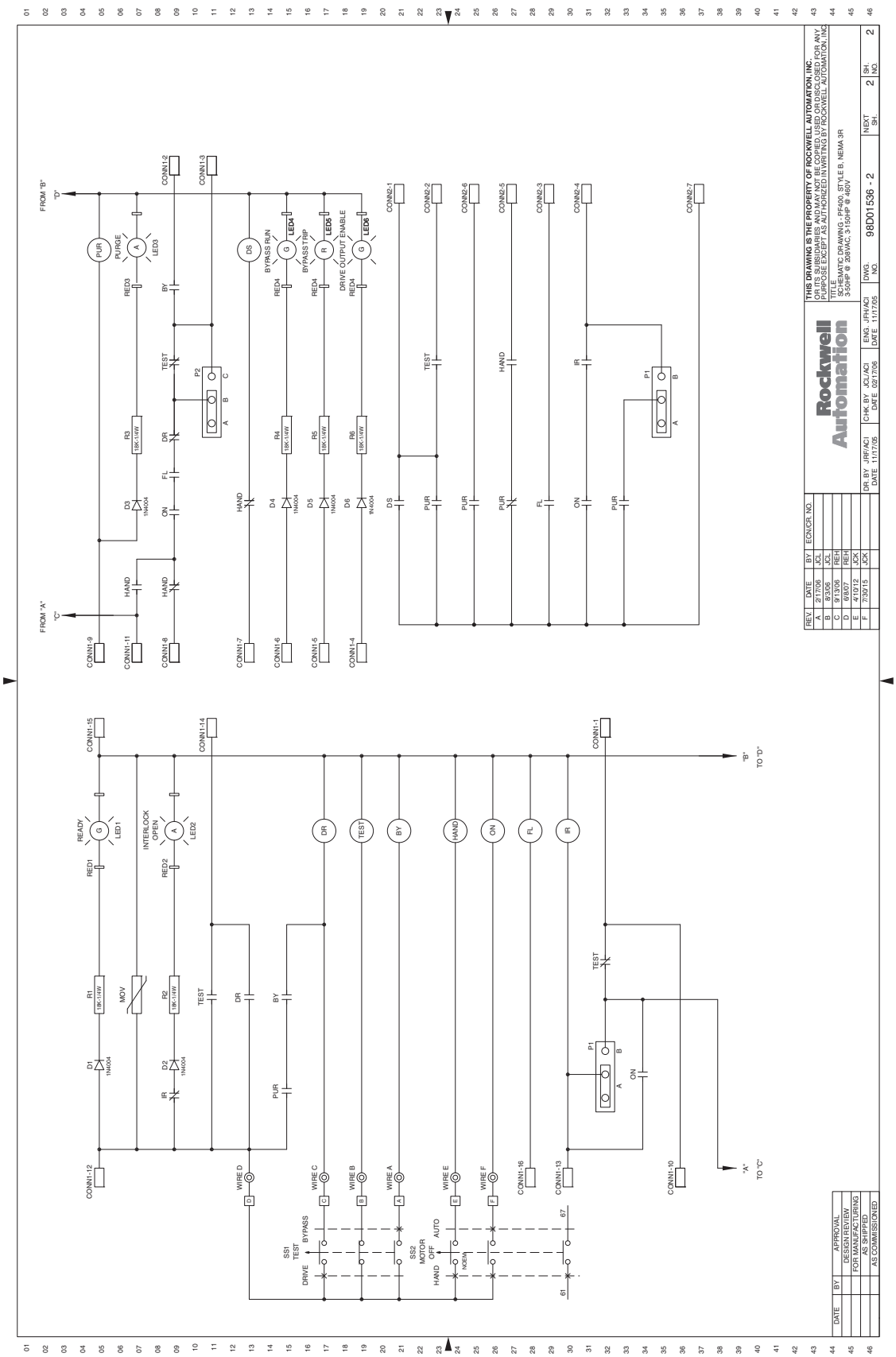


Figure 83 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 3R



Interconnect Drawings

Figure 84 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 1

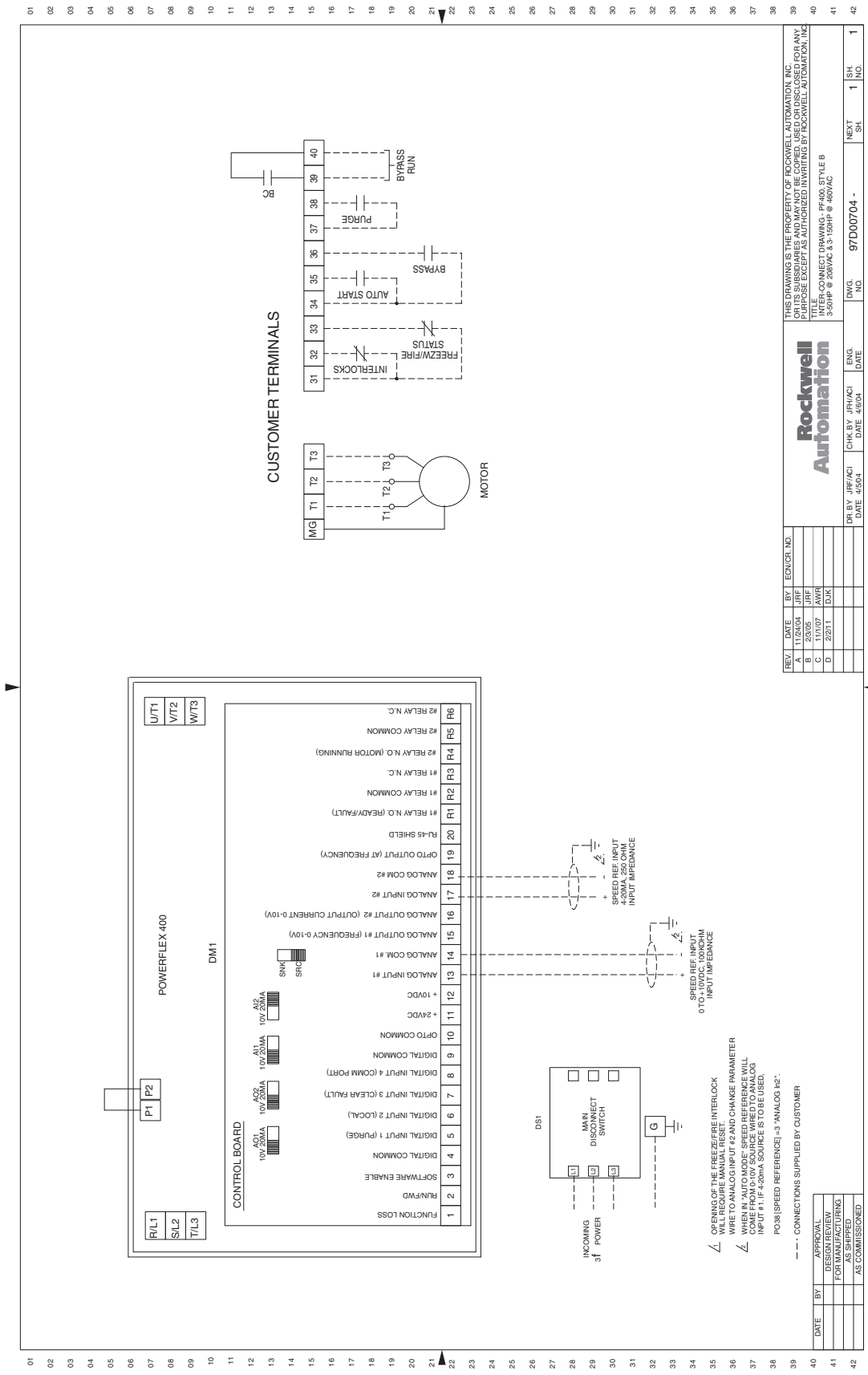


Figure 85 - 200 Hp, 460V AC Drives - NEMA/UL Type 1

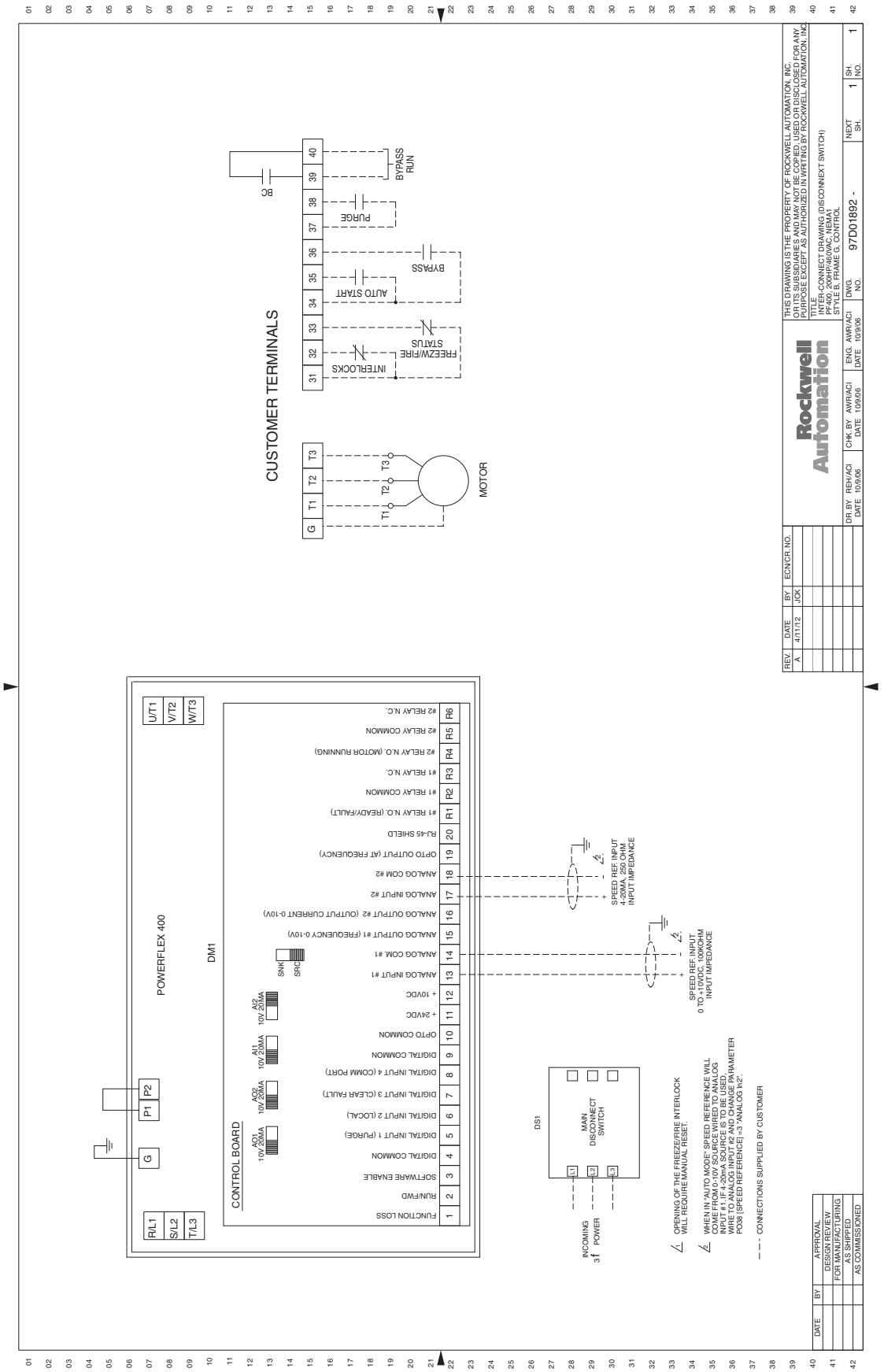


Figure 86 - 250…350 Hp, 460V AC Drives - NEMA/UL Type 1

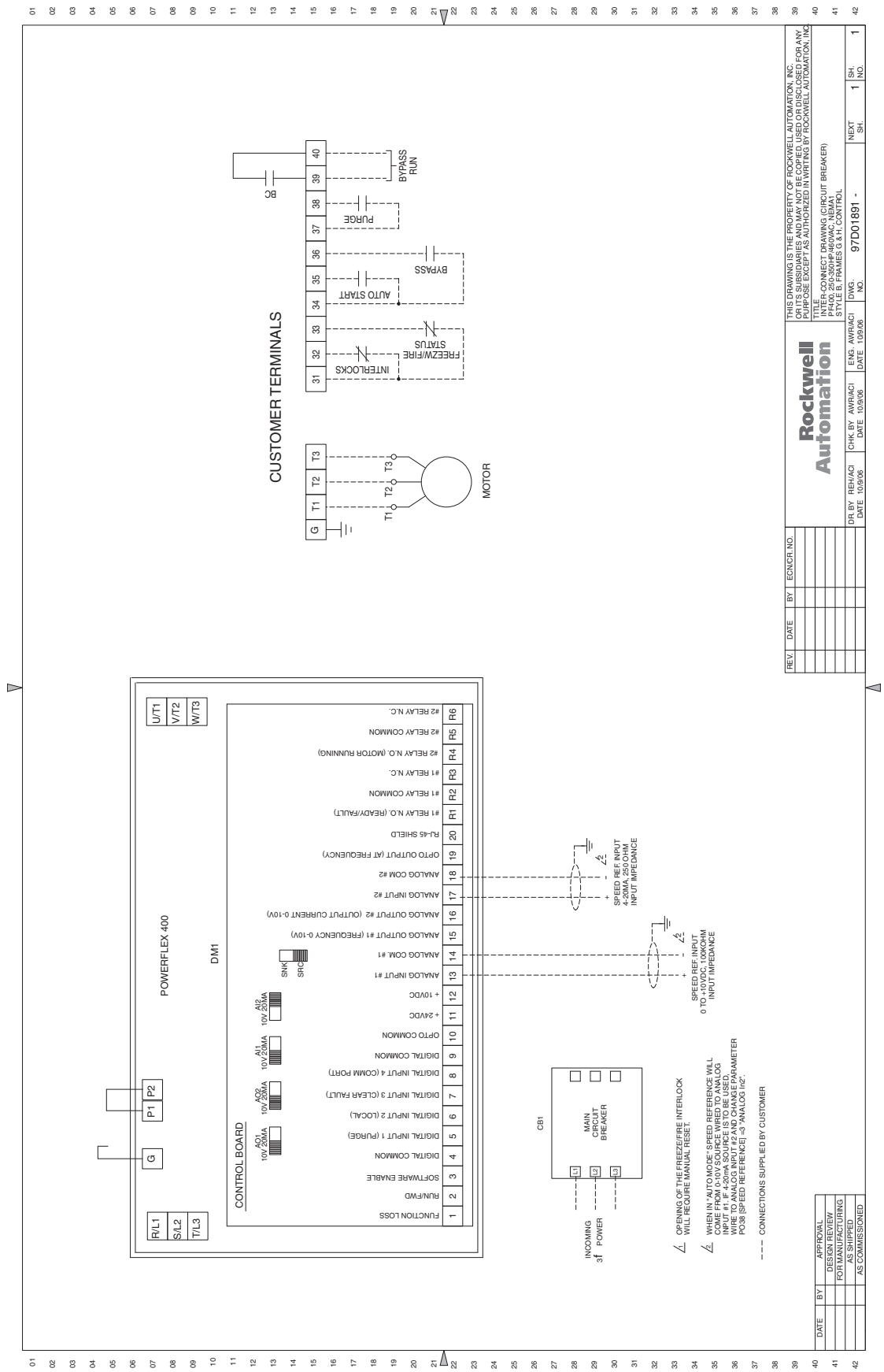


Figure 87 - 3.0…50 Hp, 208V AC and 3.0…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

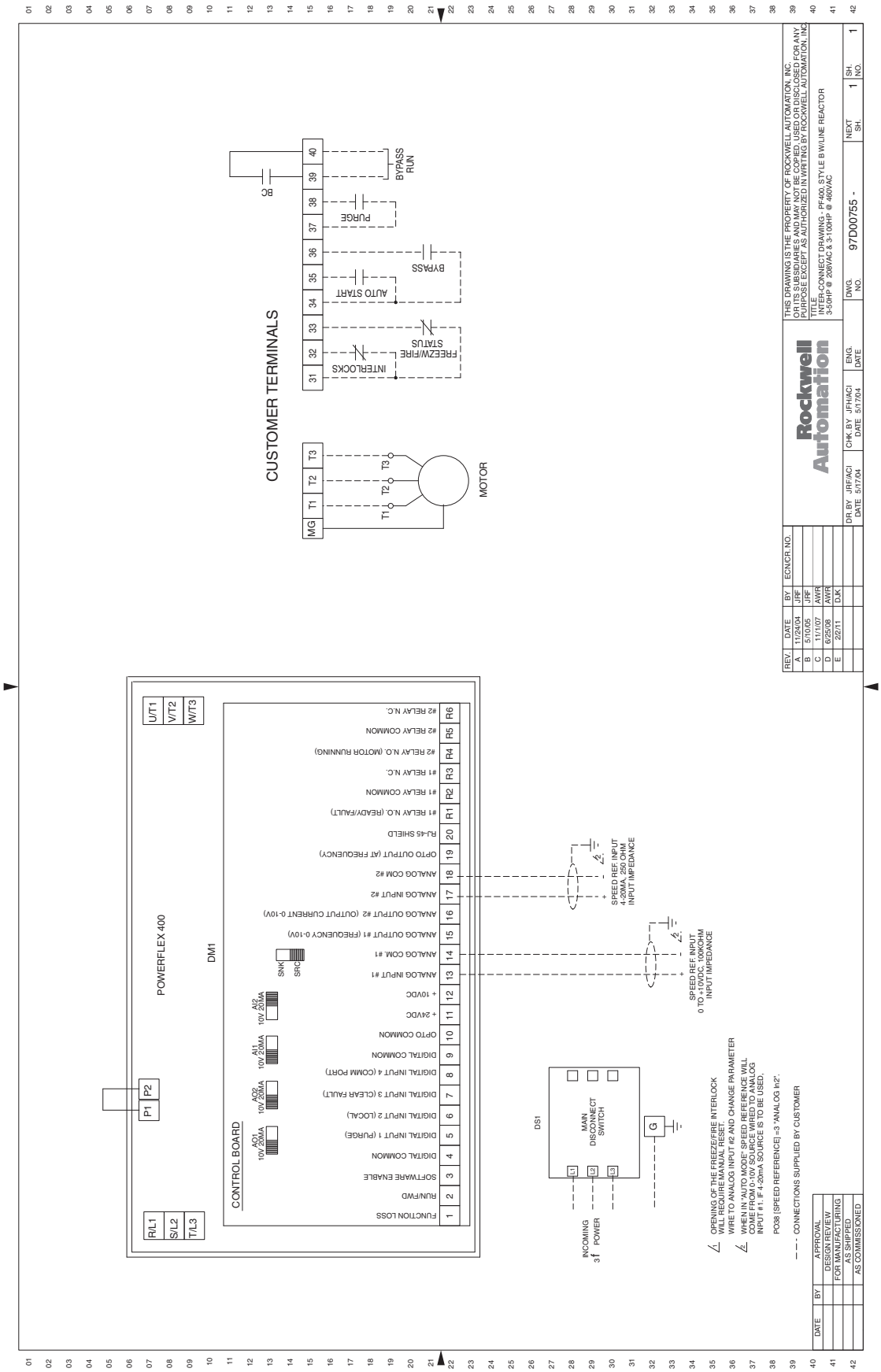
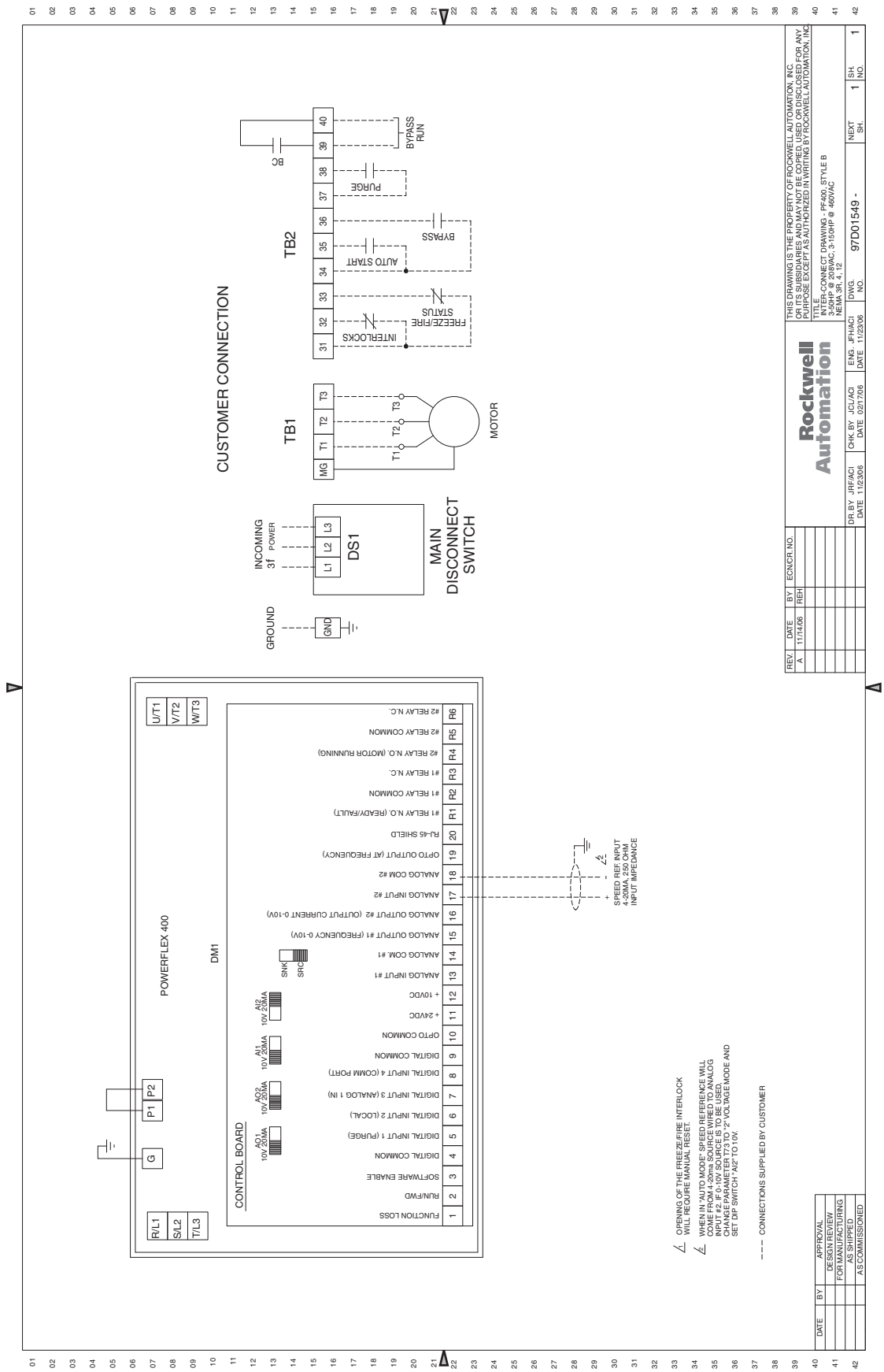


Figure 88 - 3.0…50 Hp, 208V and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12, 4, 3R



Layout Drawings

Figure 89 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives - NEMA/UL Type 1

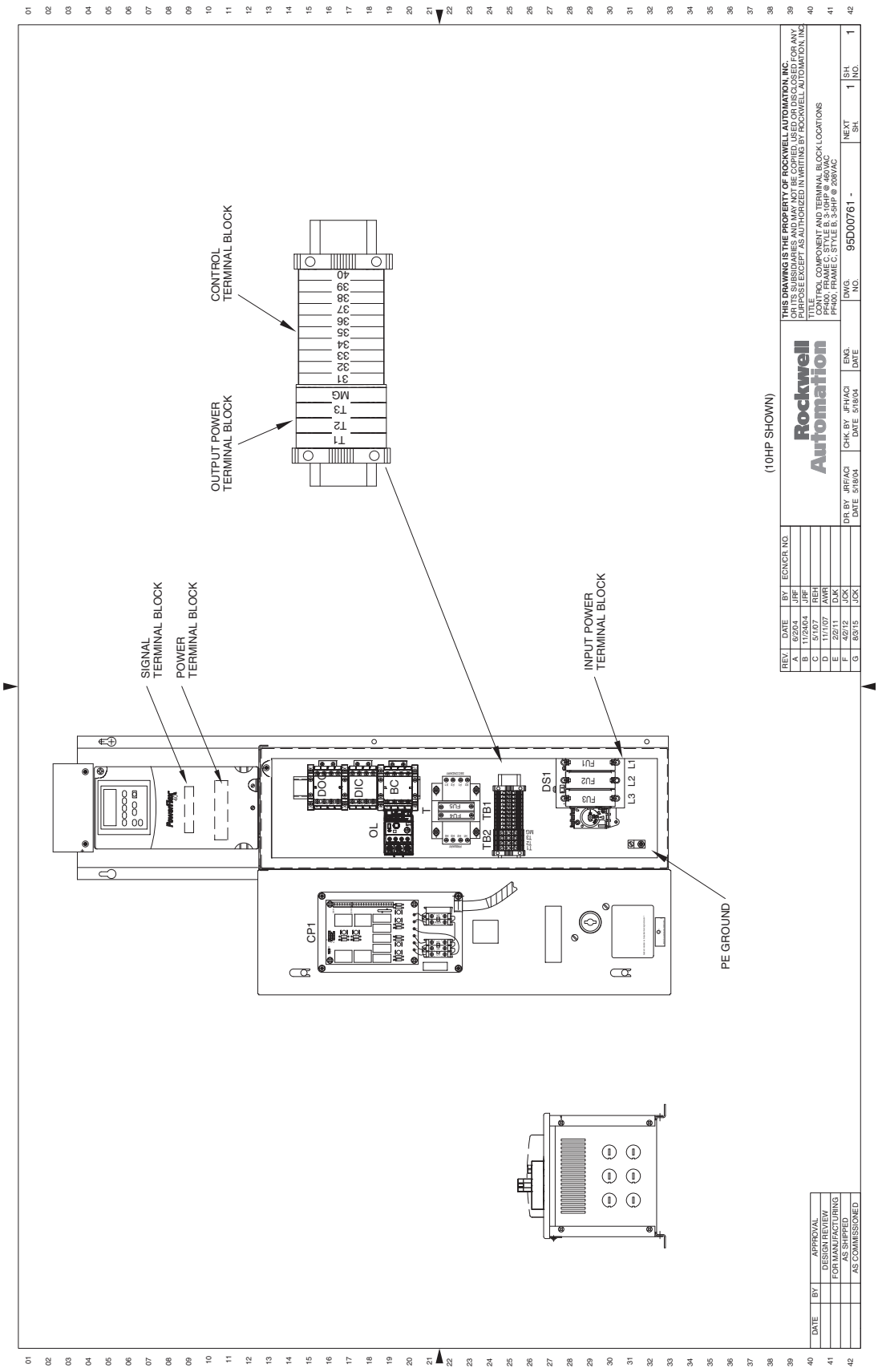


Figure 90 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives - NEMA/UL Type 1

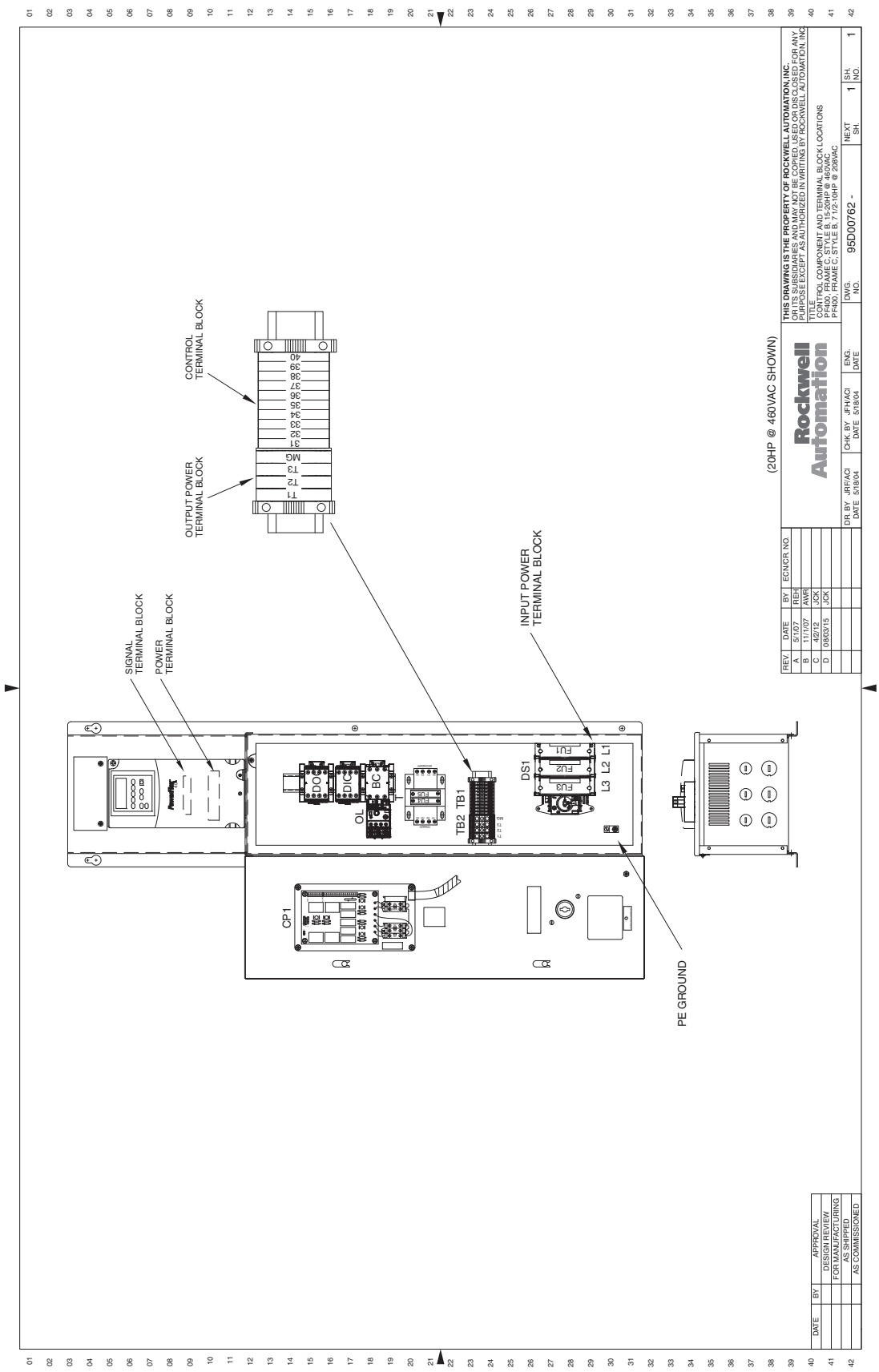


Figure 91 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 1

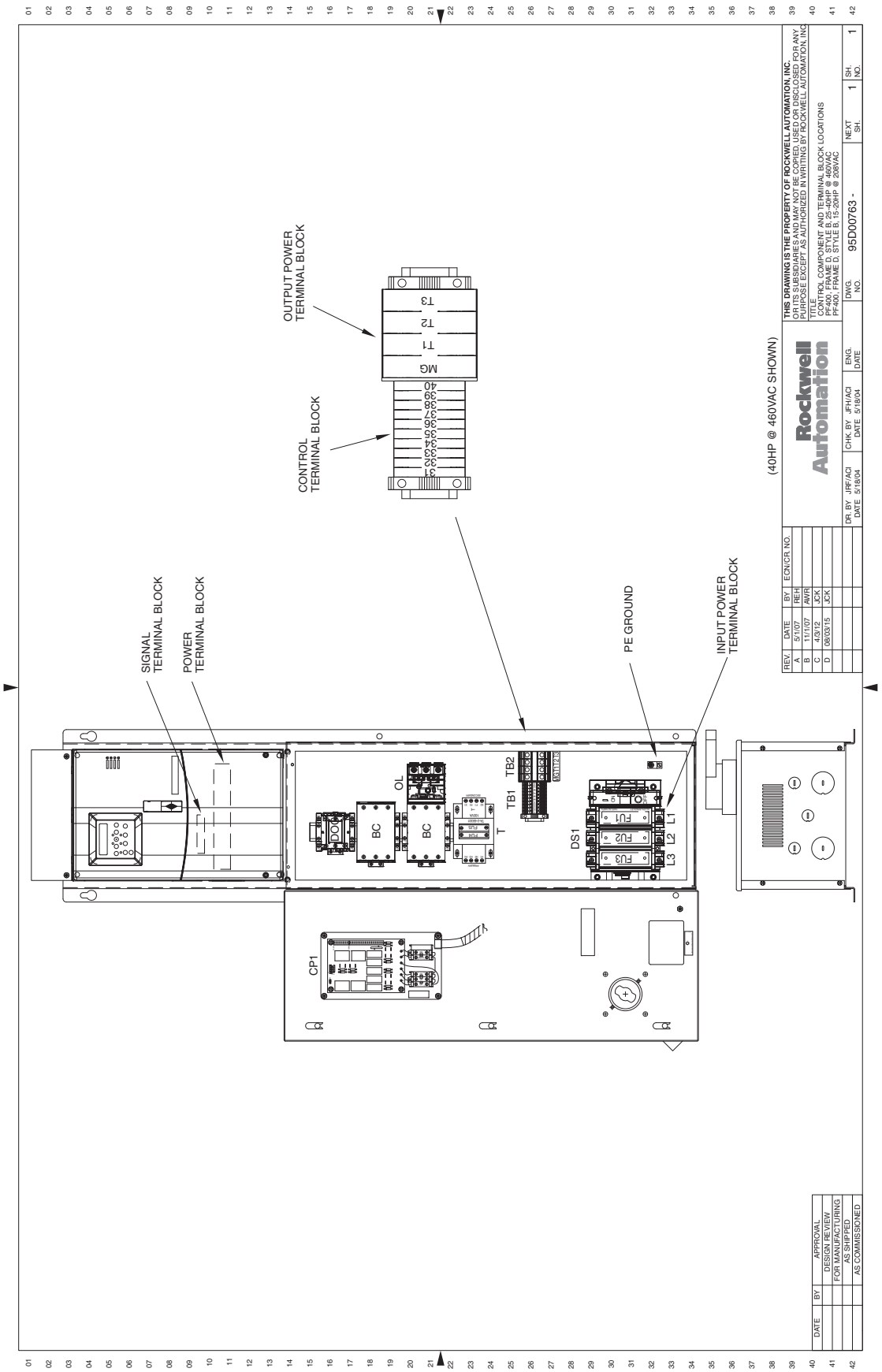


Figure 92 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 1

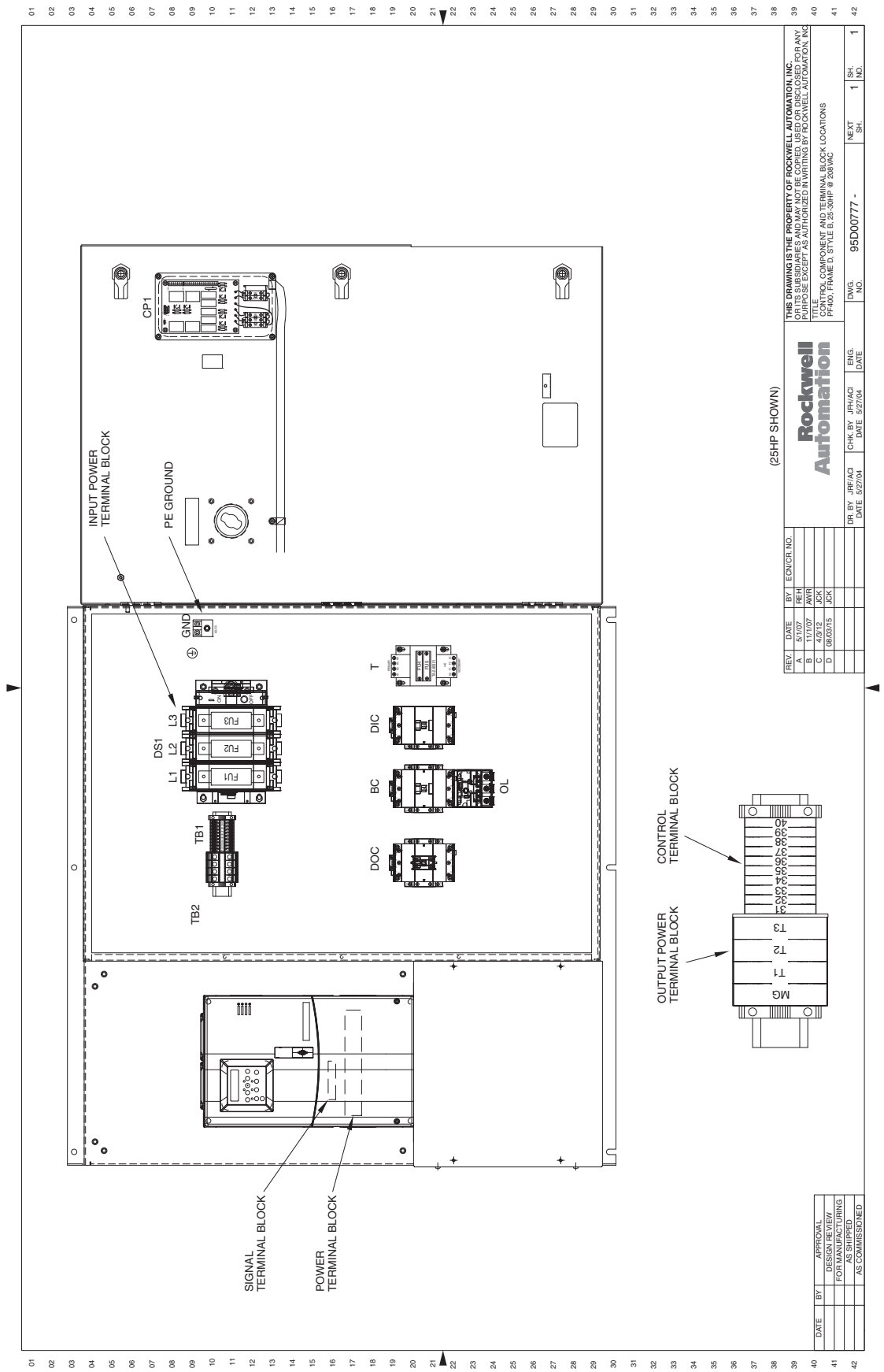


Figure 93 - 50…75 Hp, 460V AC Drives - NEMA/UL Type 1

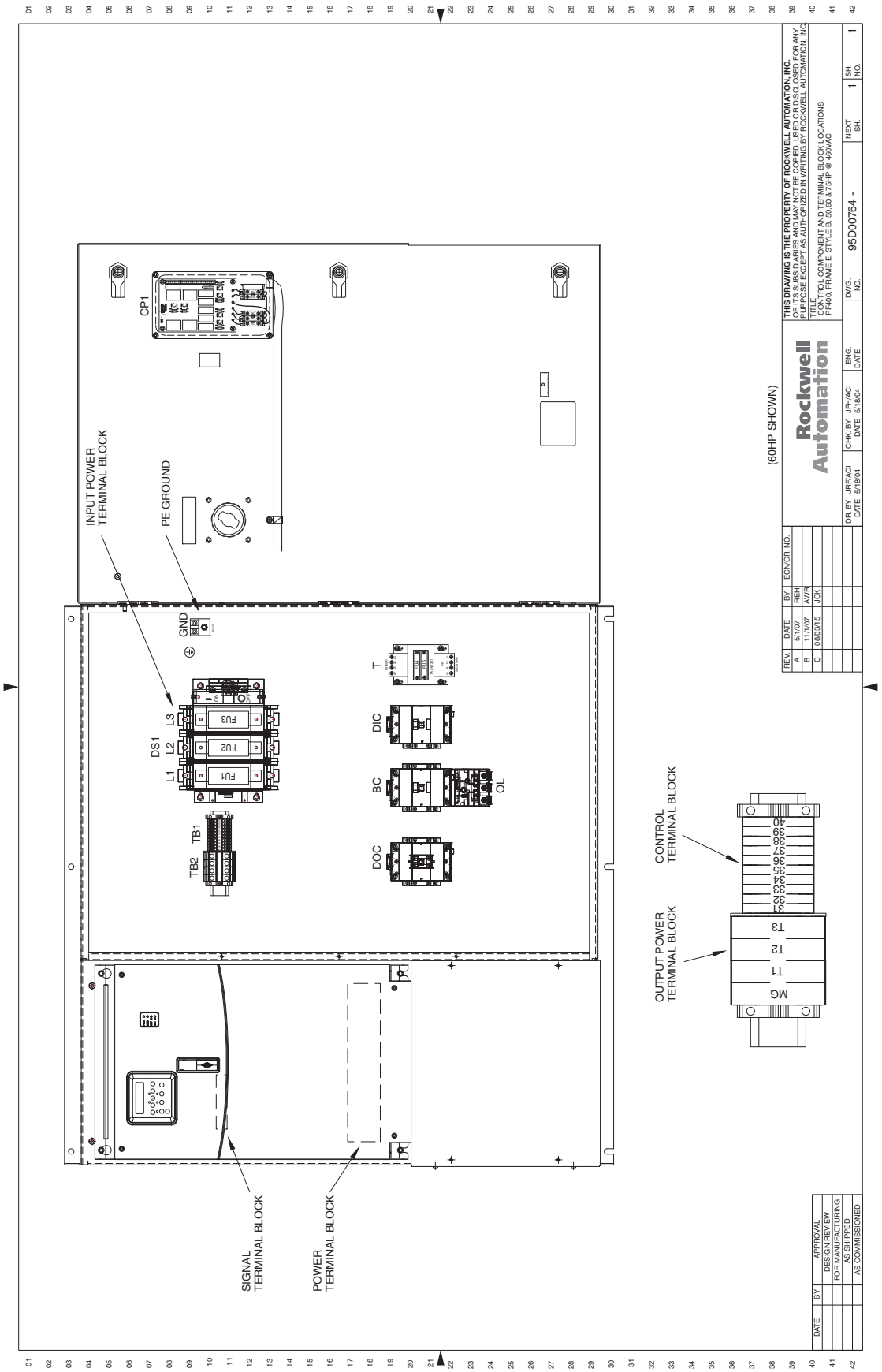


Figure 94 - 40 Hp, 208V AC and 100 Hp, 460V AC Drives - NEMA/UL Type 1

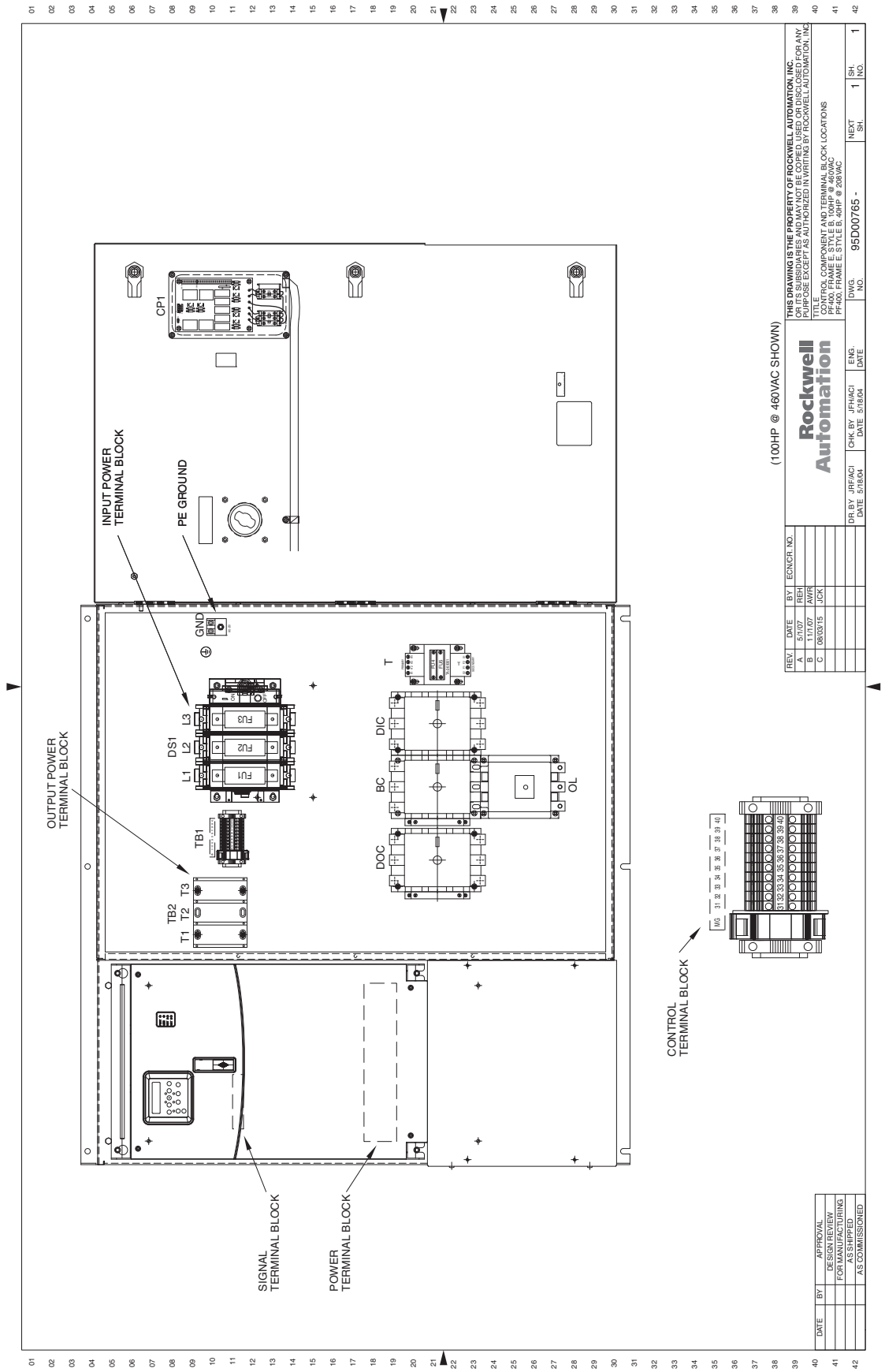


Figure 95 - 50 Hp, 208V AC Drives - NEMA/UL Type 1

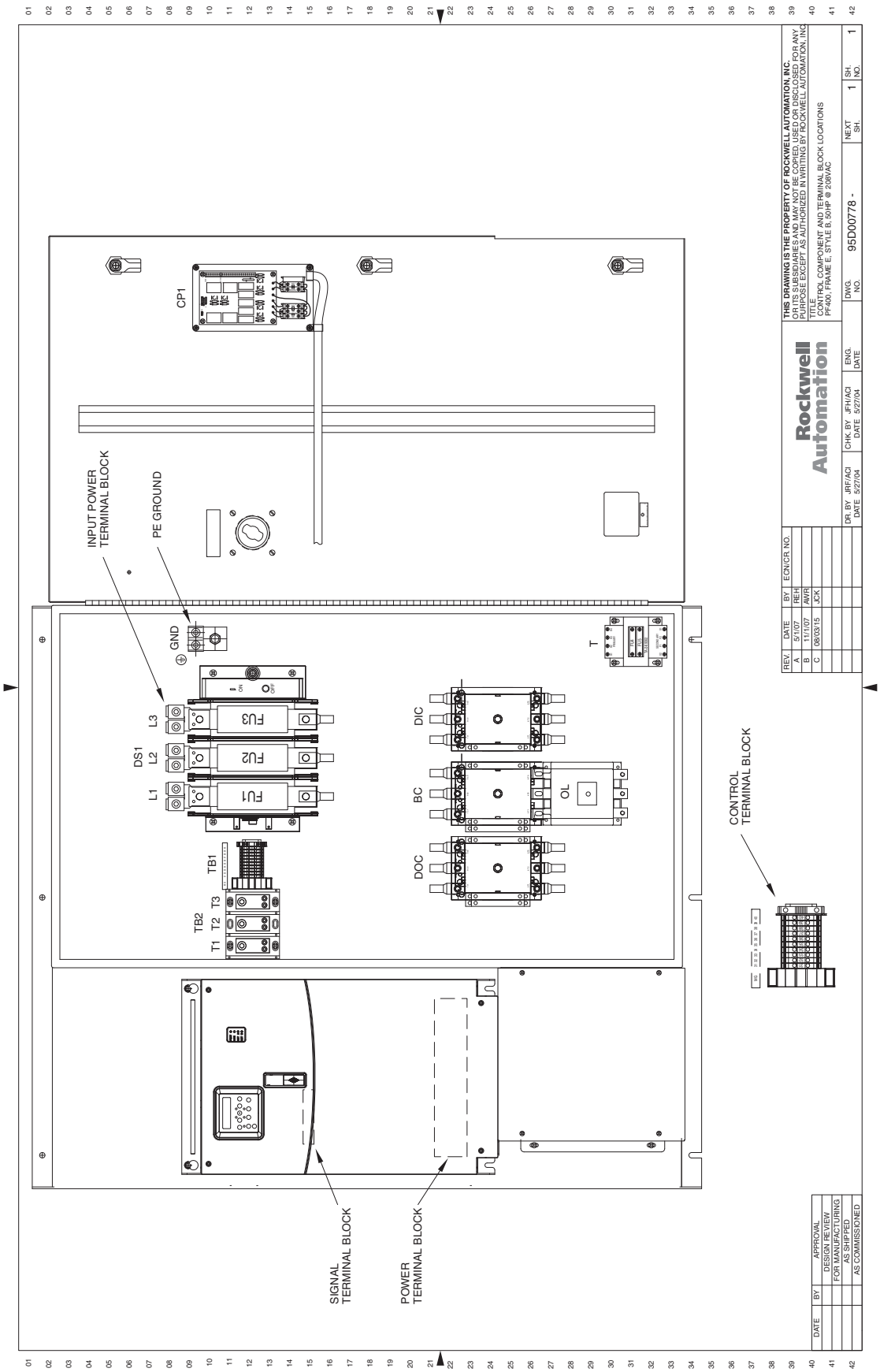


Figure 96 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 1

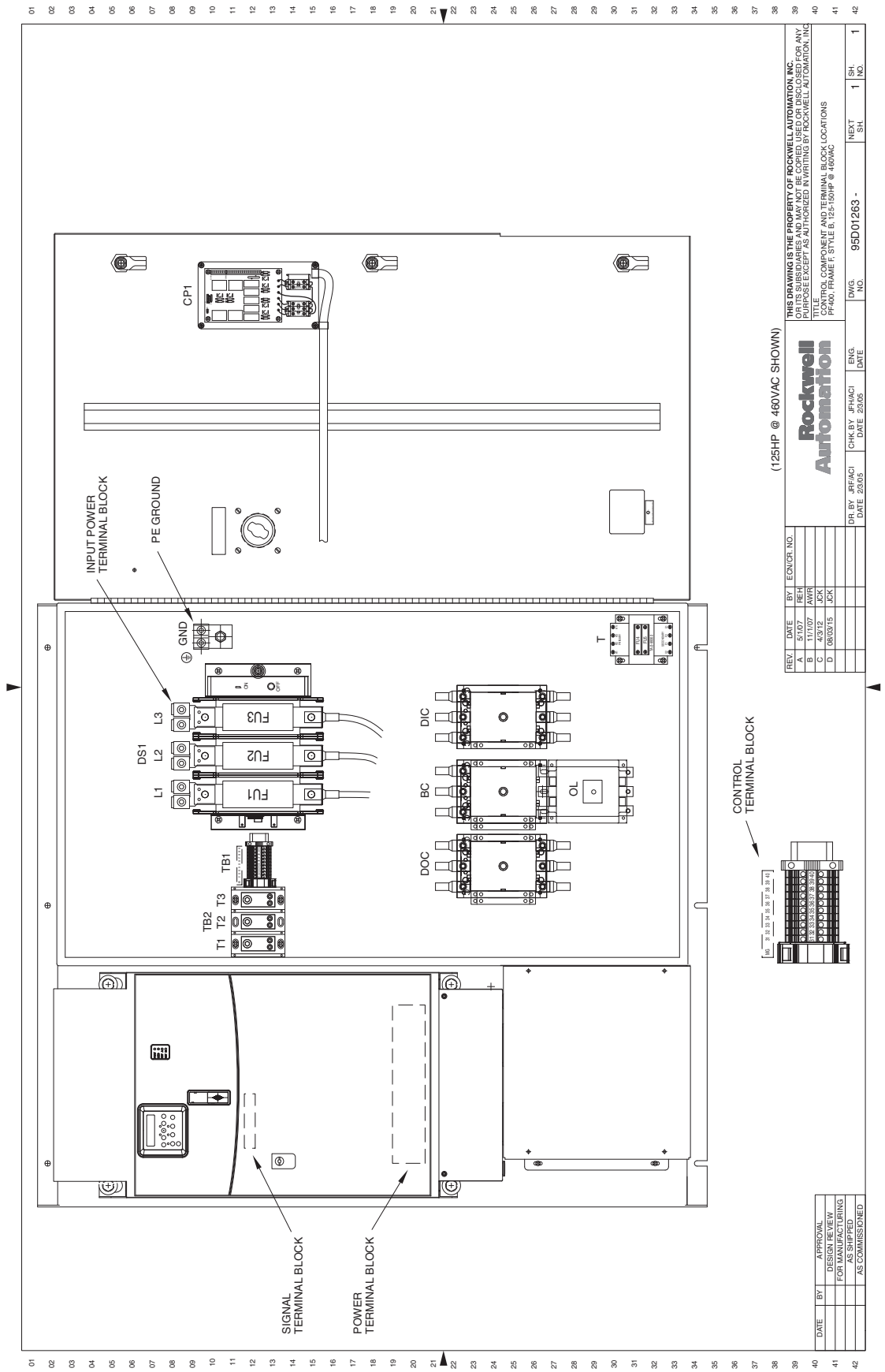


Figure 97 - 200…250 Hp, 460V AC Drives - NEMA/UL Type 1

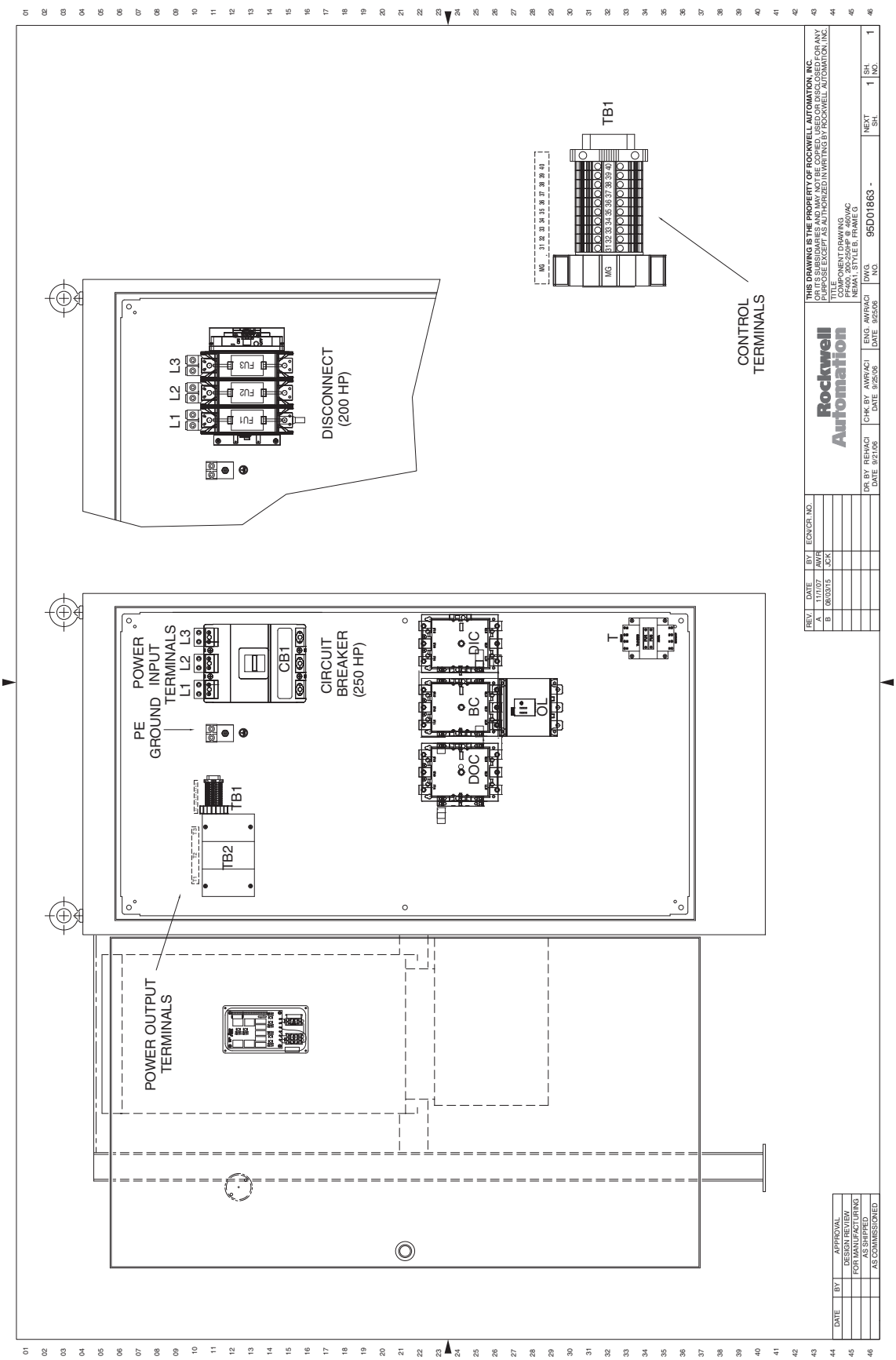


Figure 98 - 300…350 Hp, 460V AC Drives - NEMA/UL Type 1

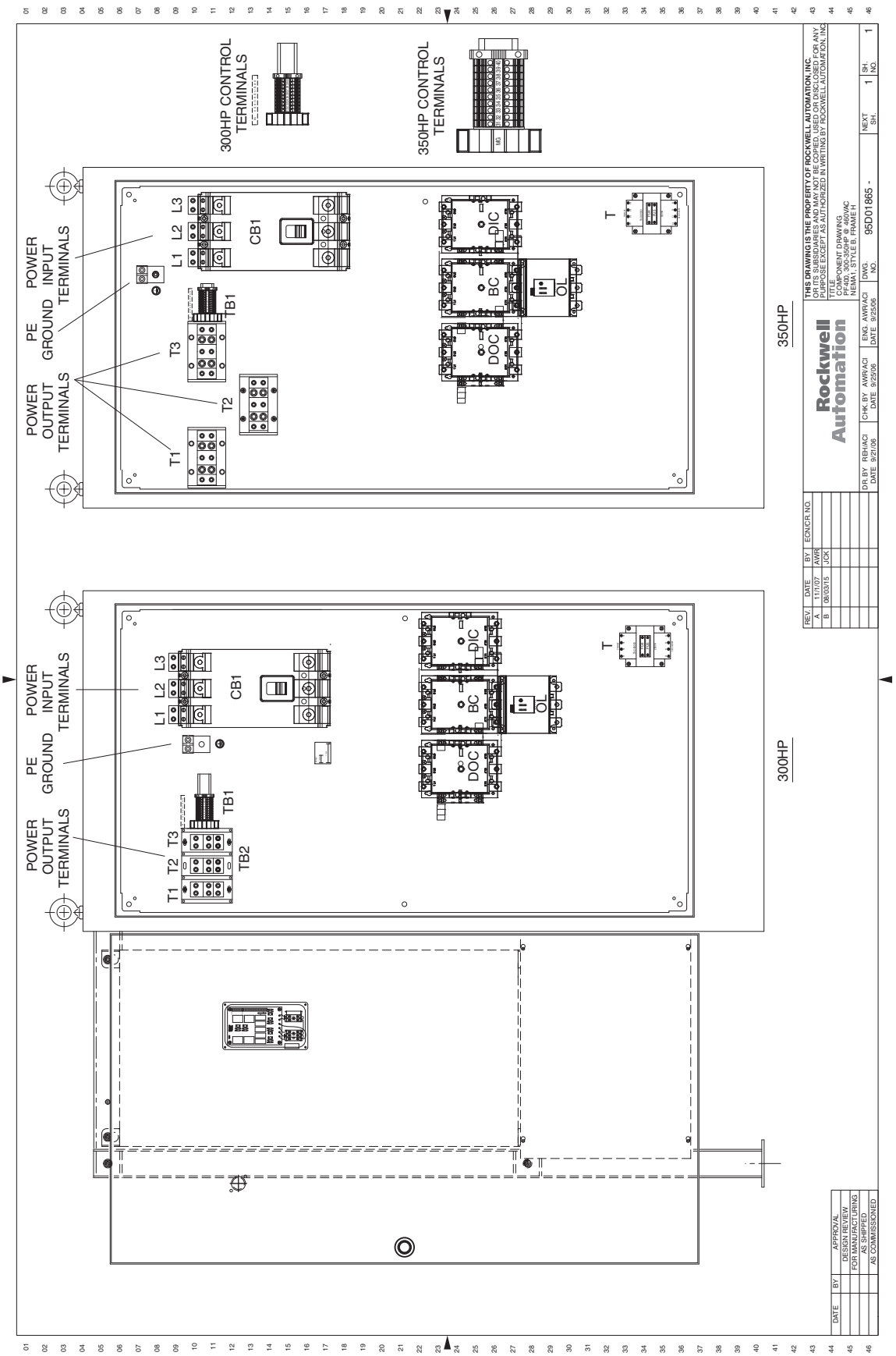


Figure 99 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

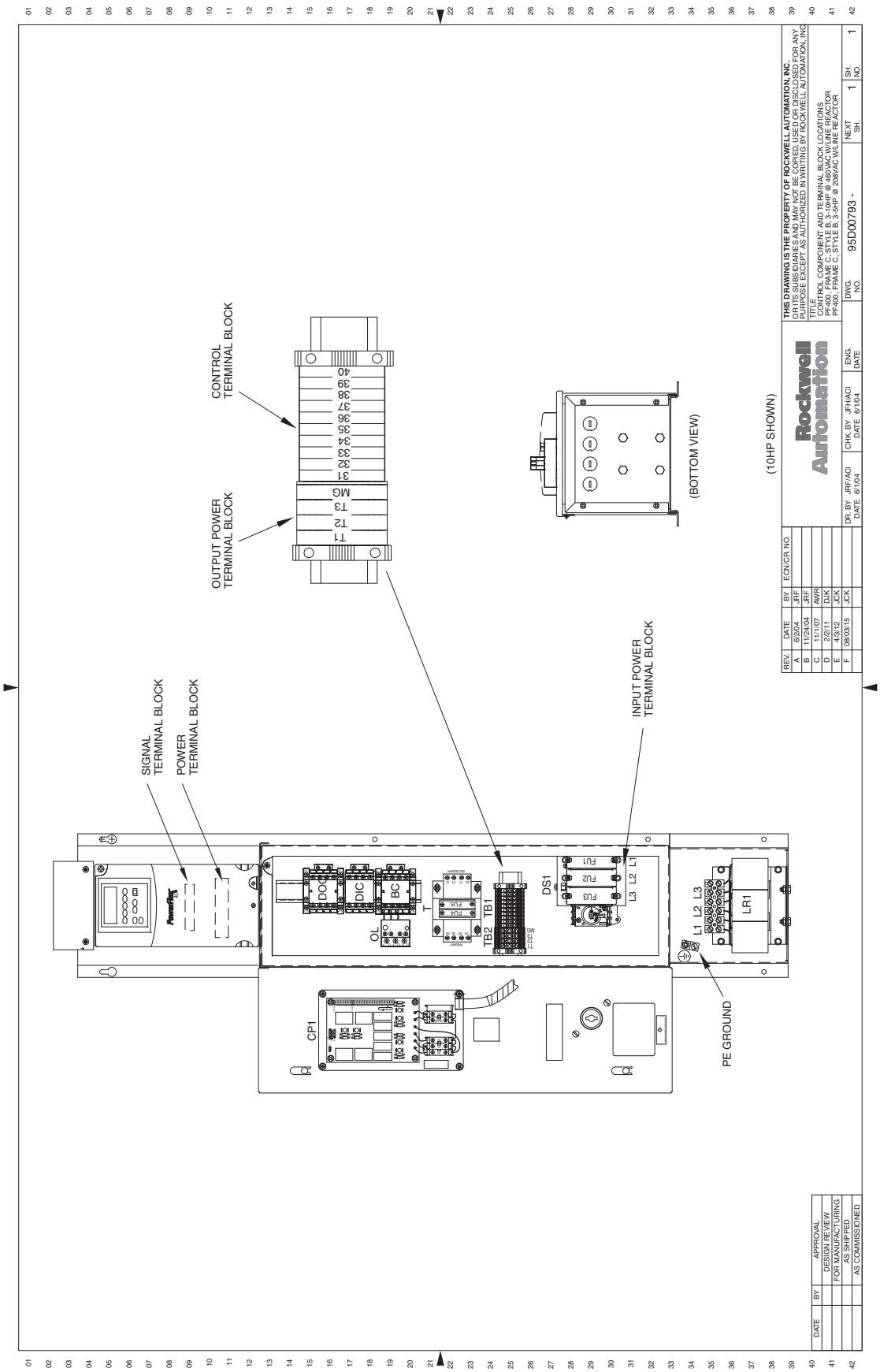


Figure 100 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

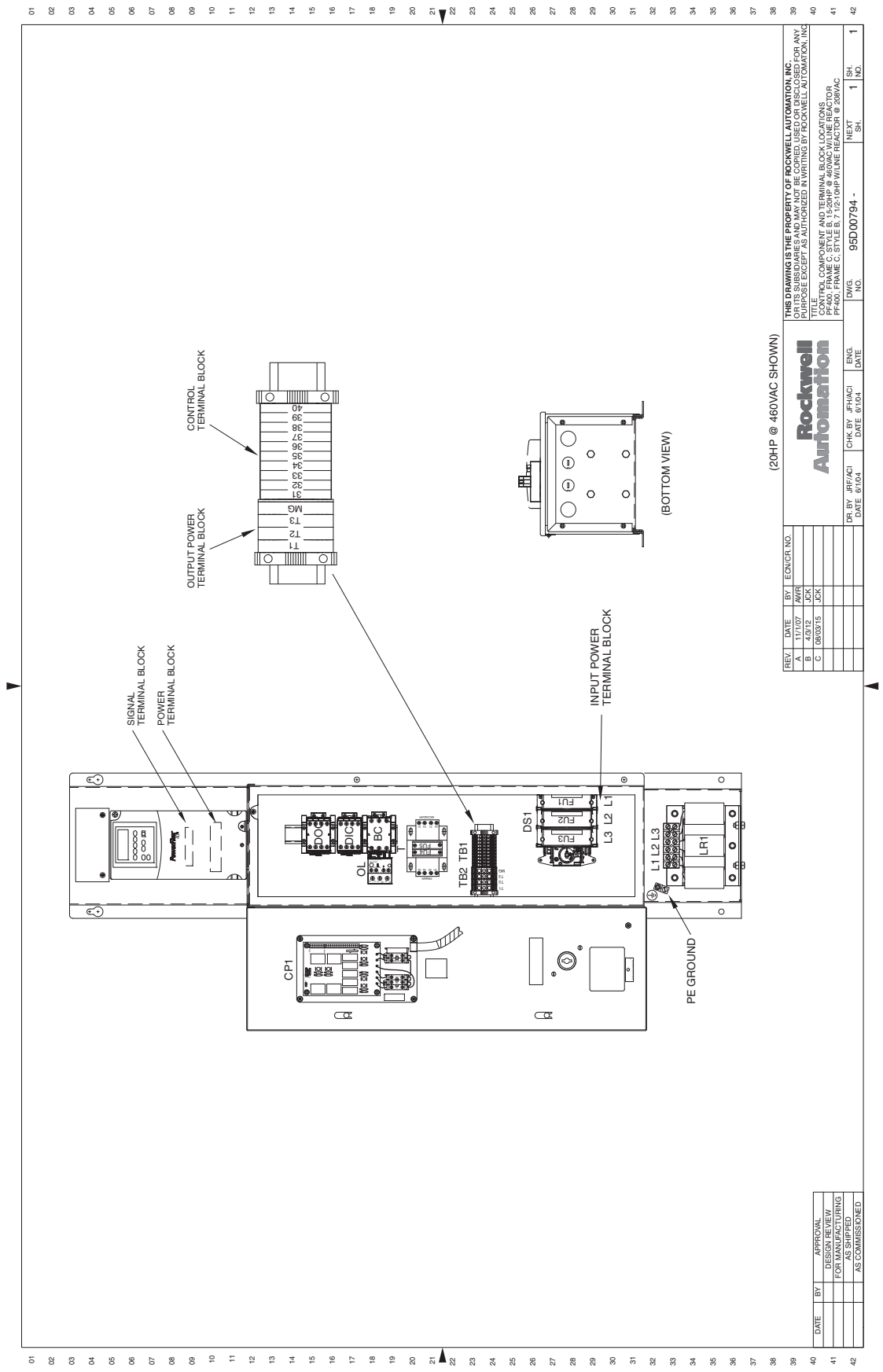


Figure 101 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

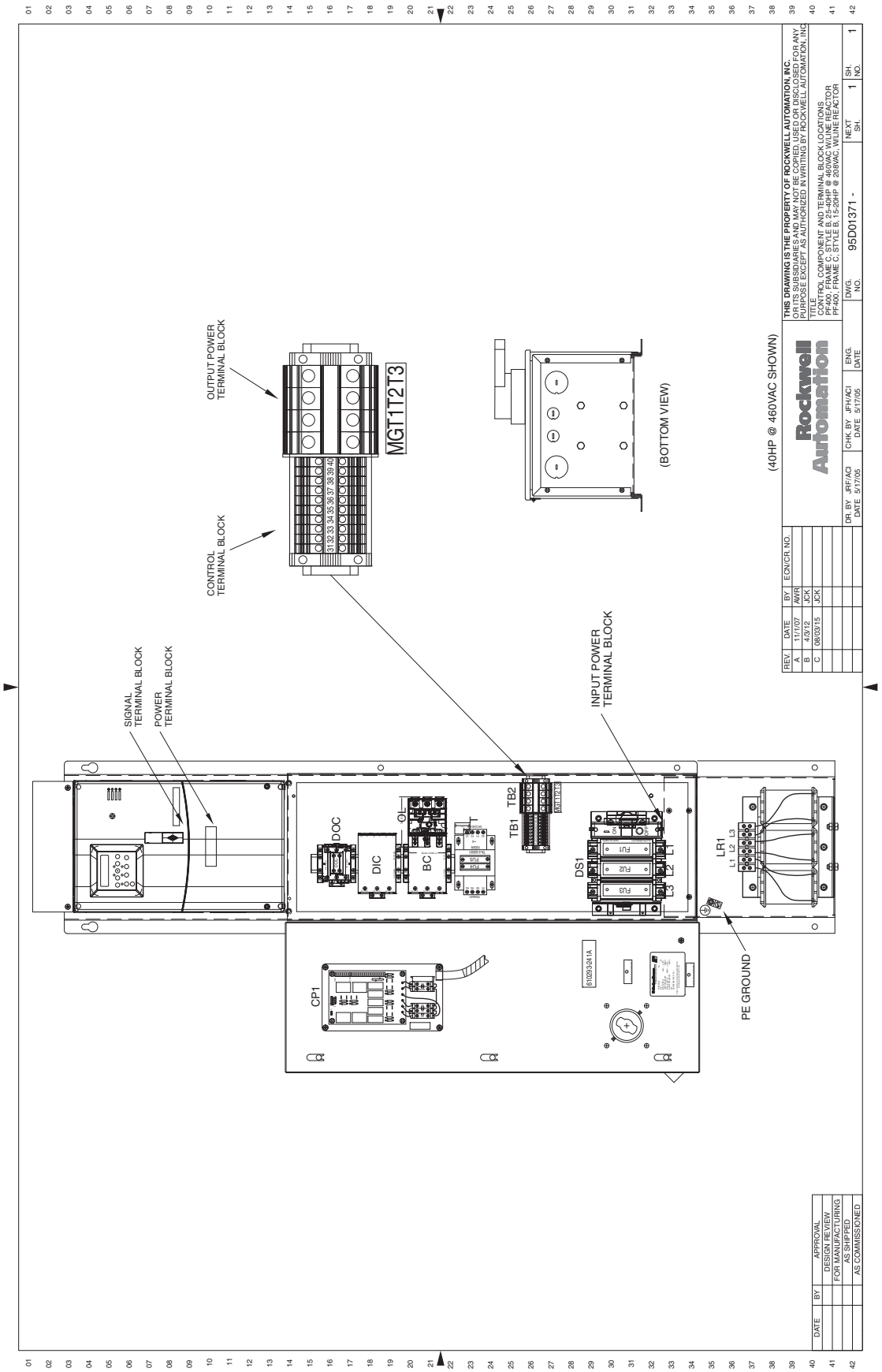


Figure 102 - 25 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1

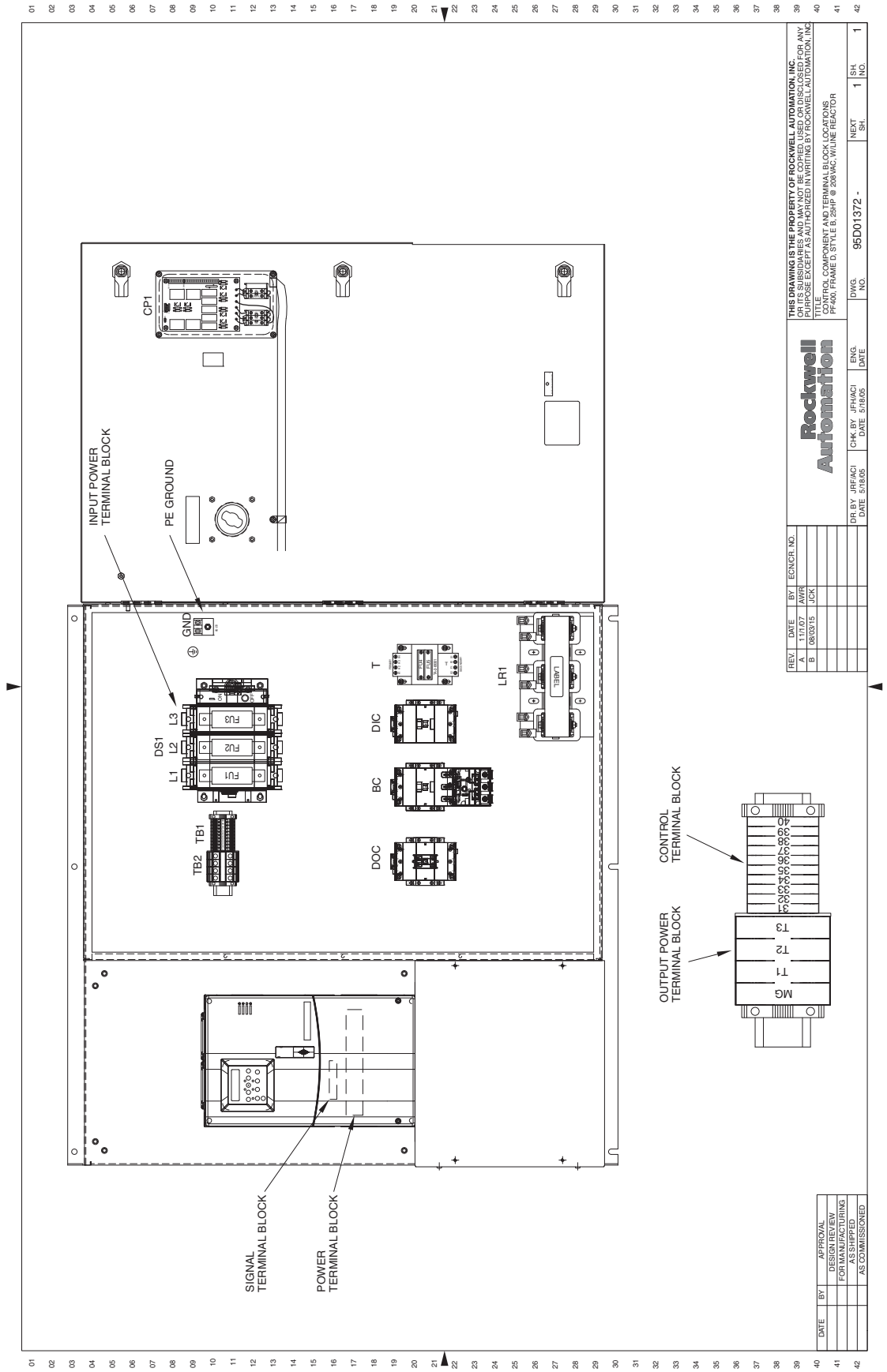


Figure 103 - 30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1

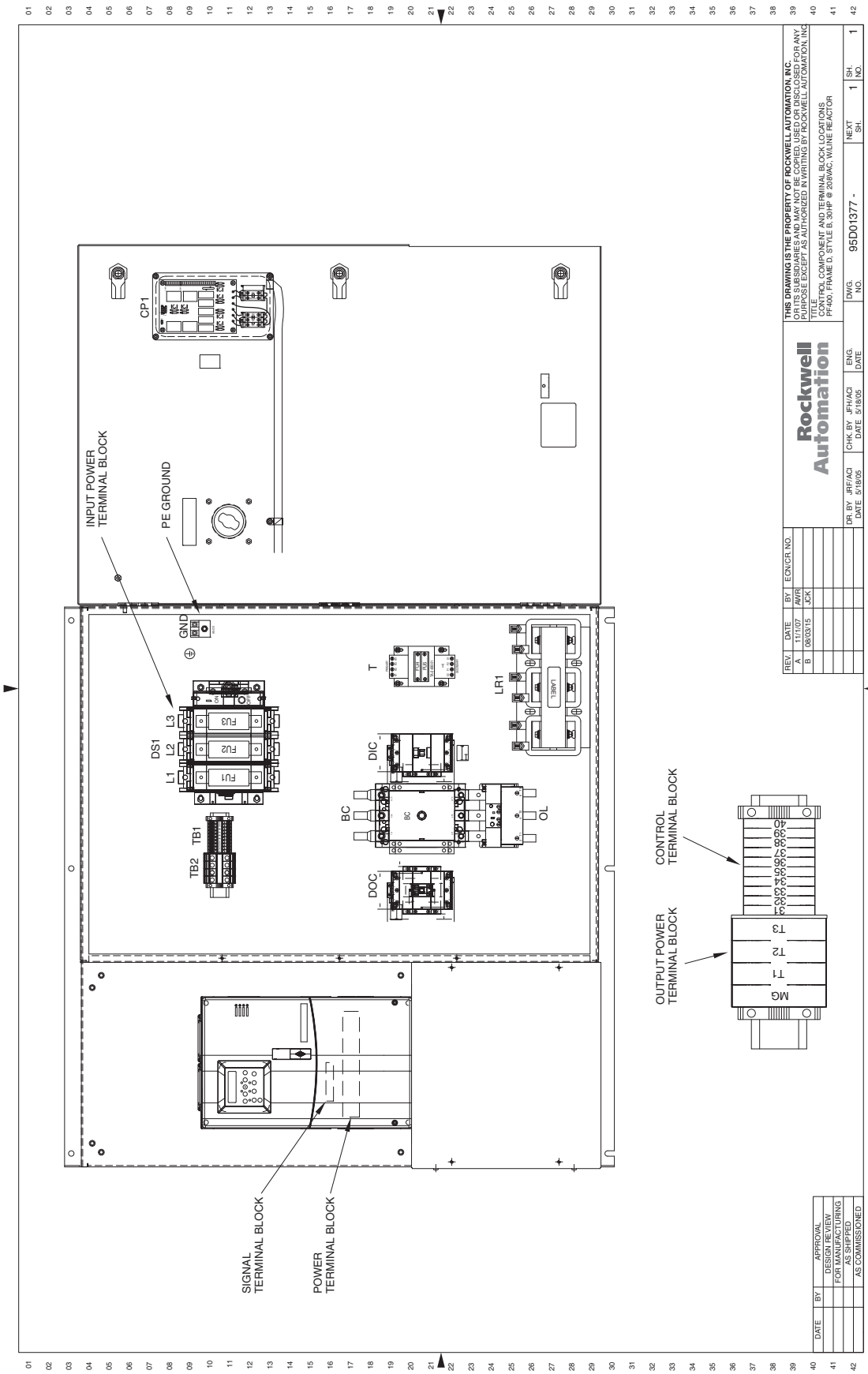


Figure 104 - 50…60 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

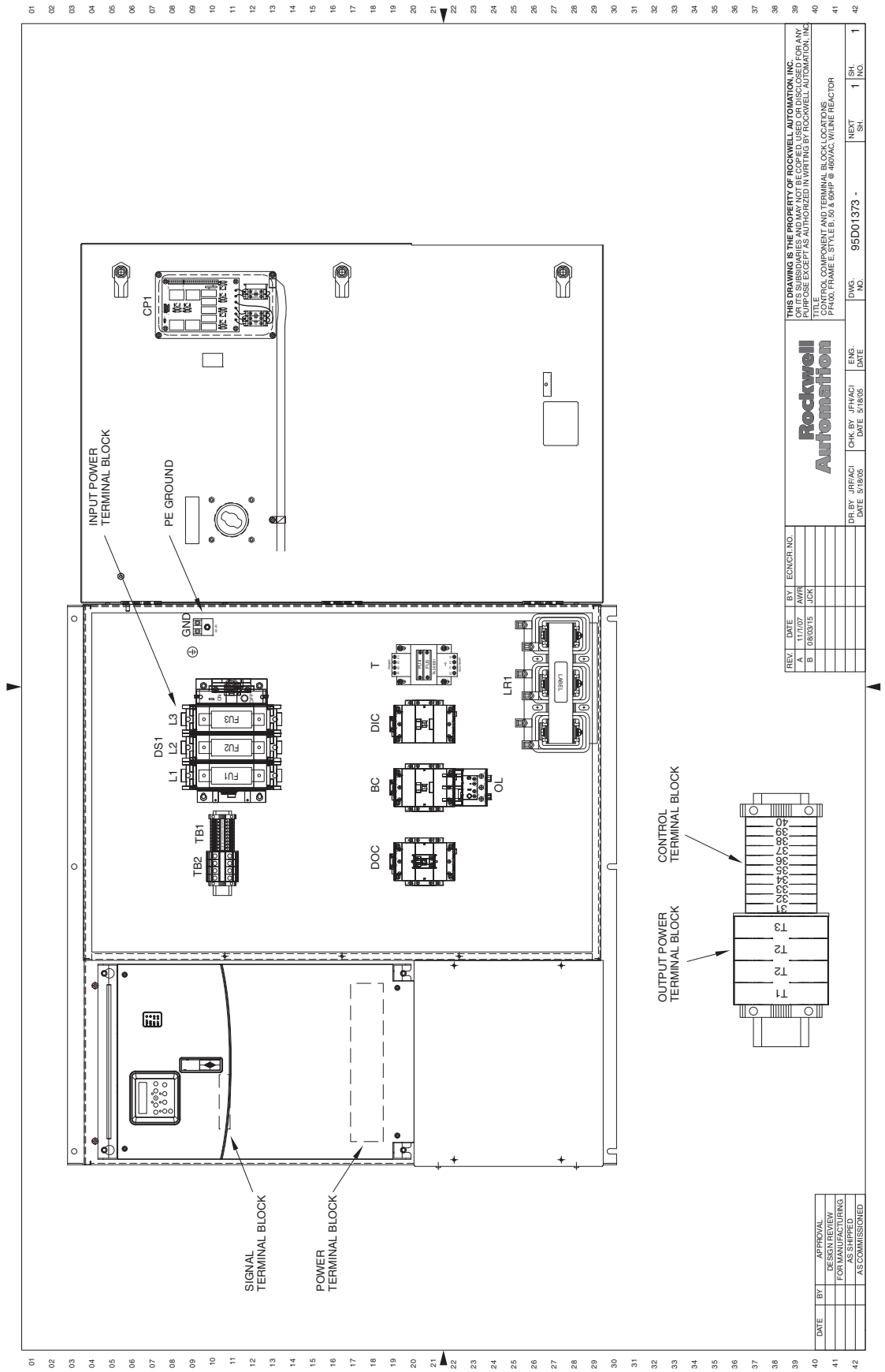


Figure 105 - 40…50 Hp, 208V AC and 75…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

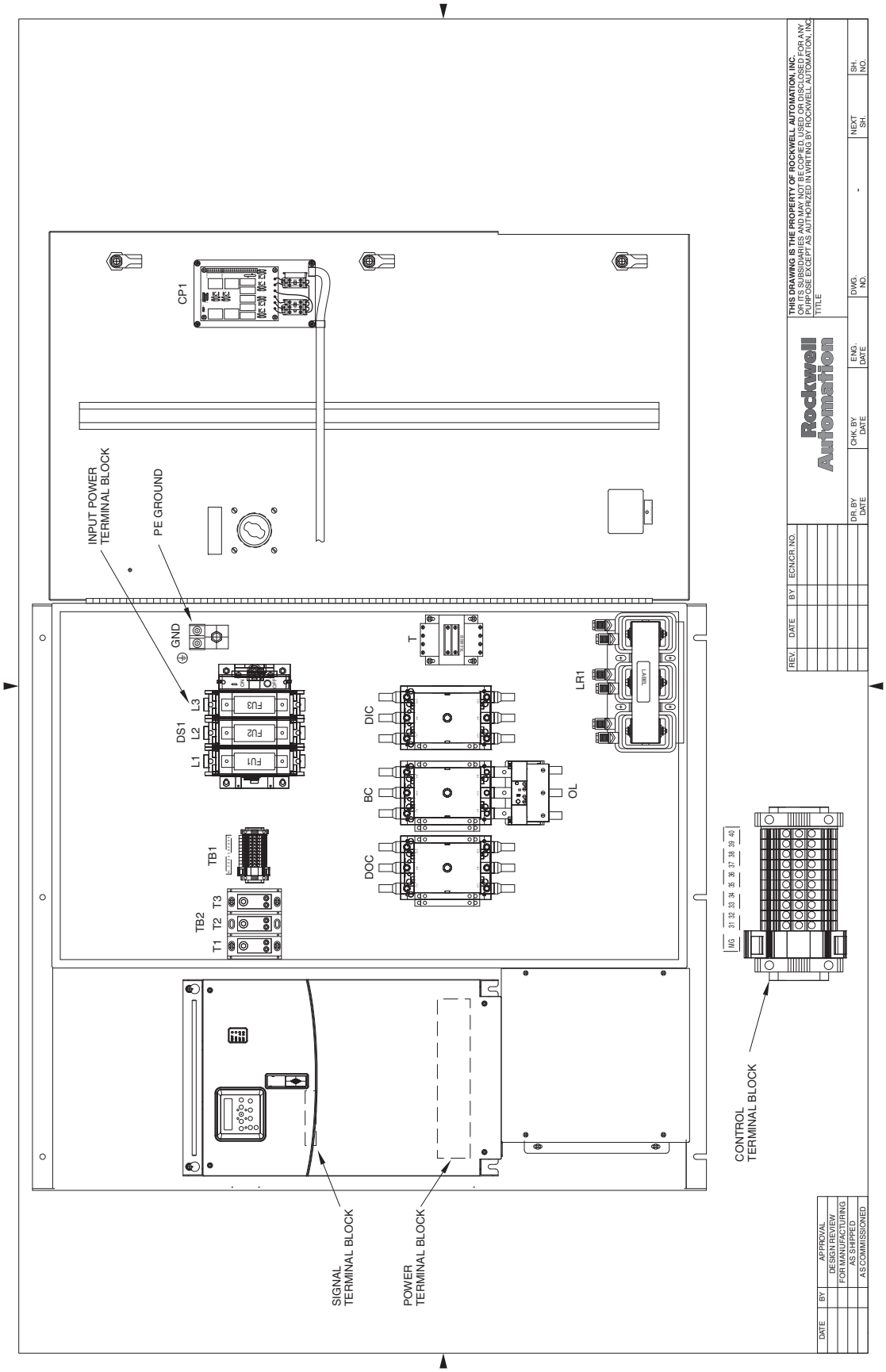


Figure 106 - 3.0…10 Hp, 208V AC and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 12

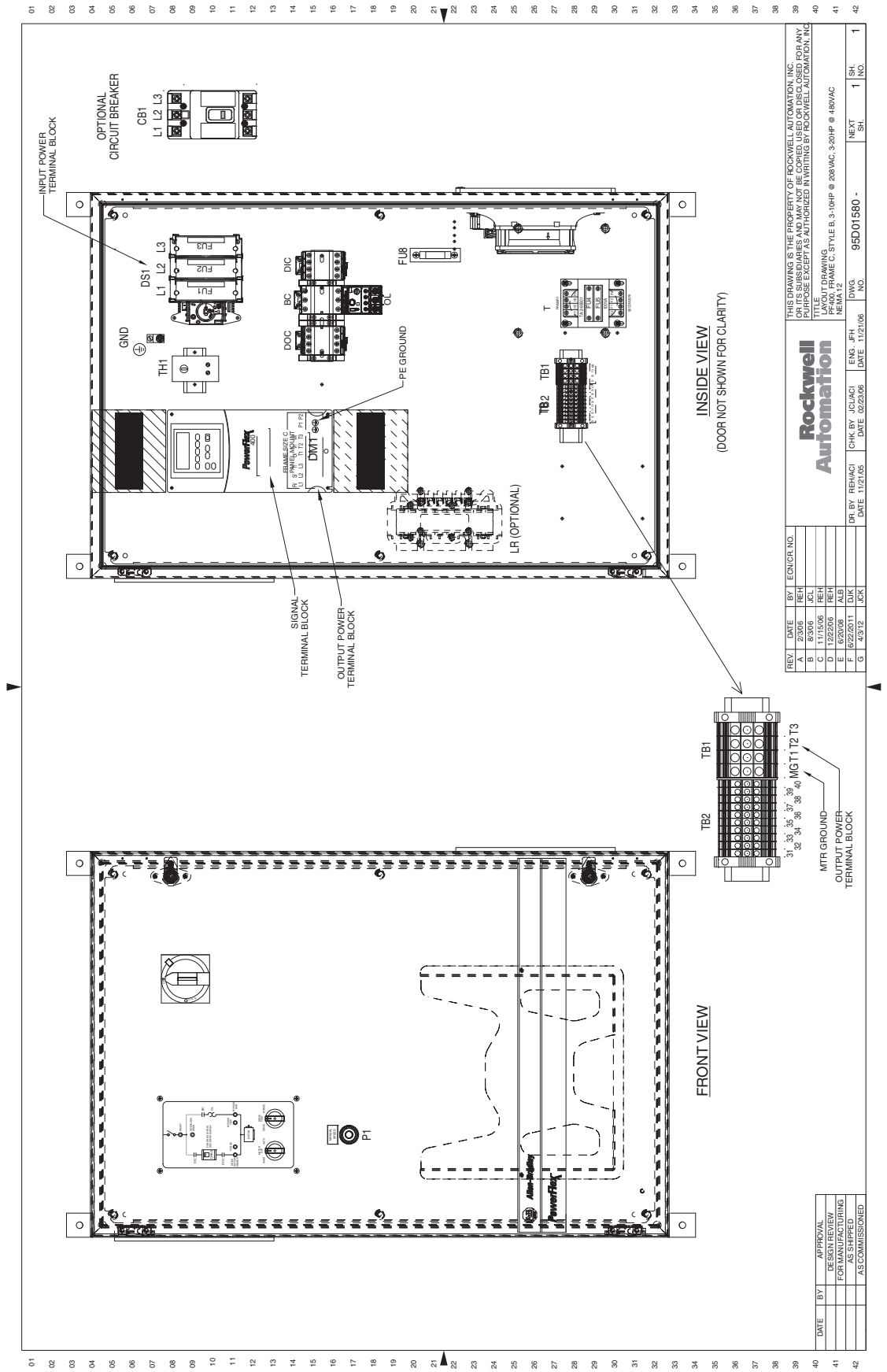


Figure 107 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 12

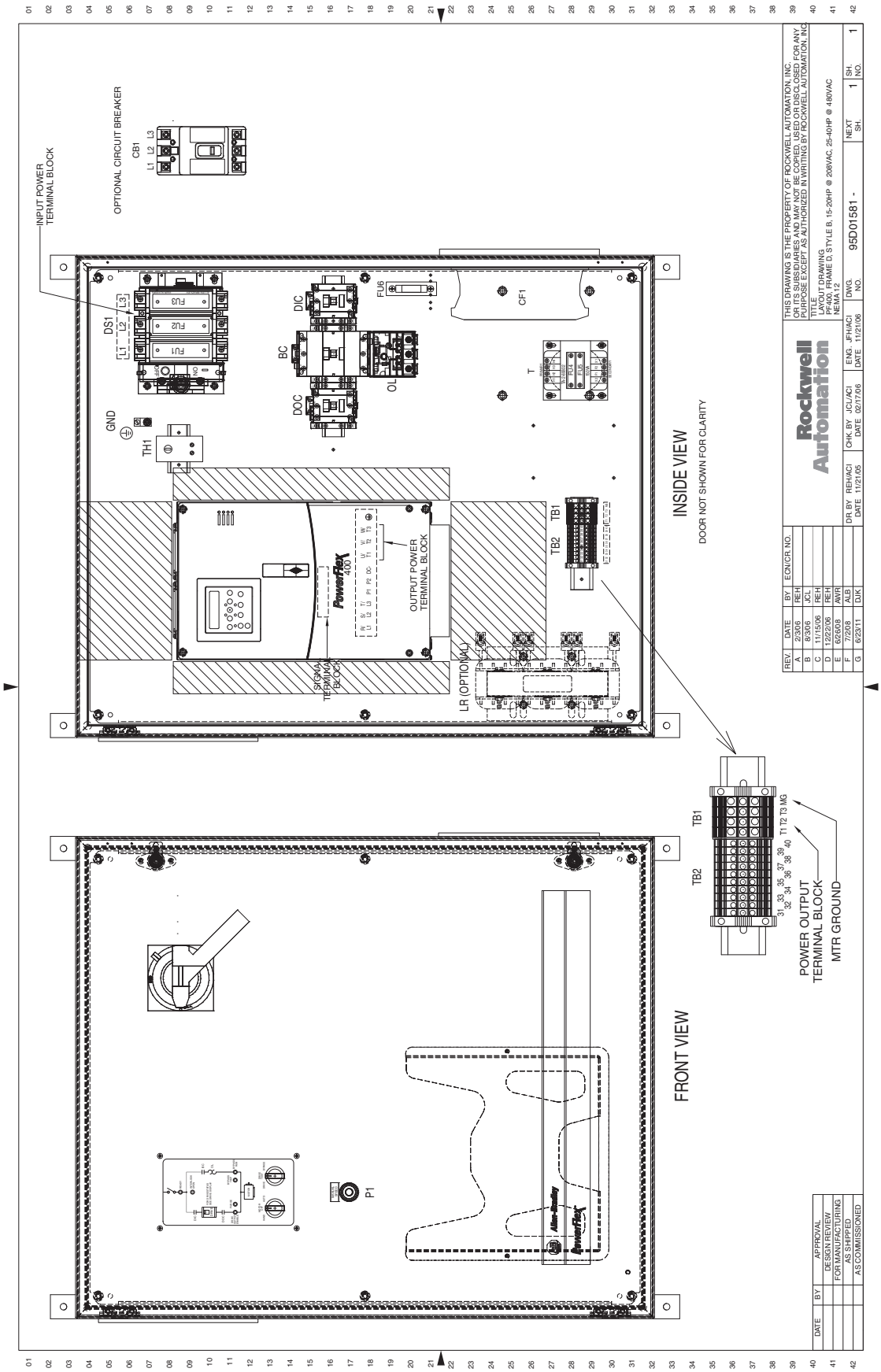


Figure 108 - 25…30 Hp, 208V AC and 50…60 Hp, 460V AC Drives - NEMA/UL Type 12

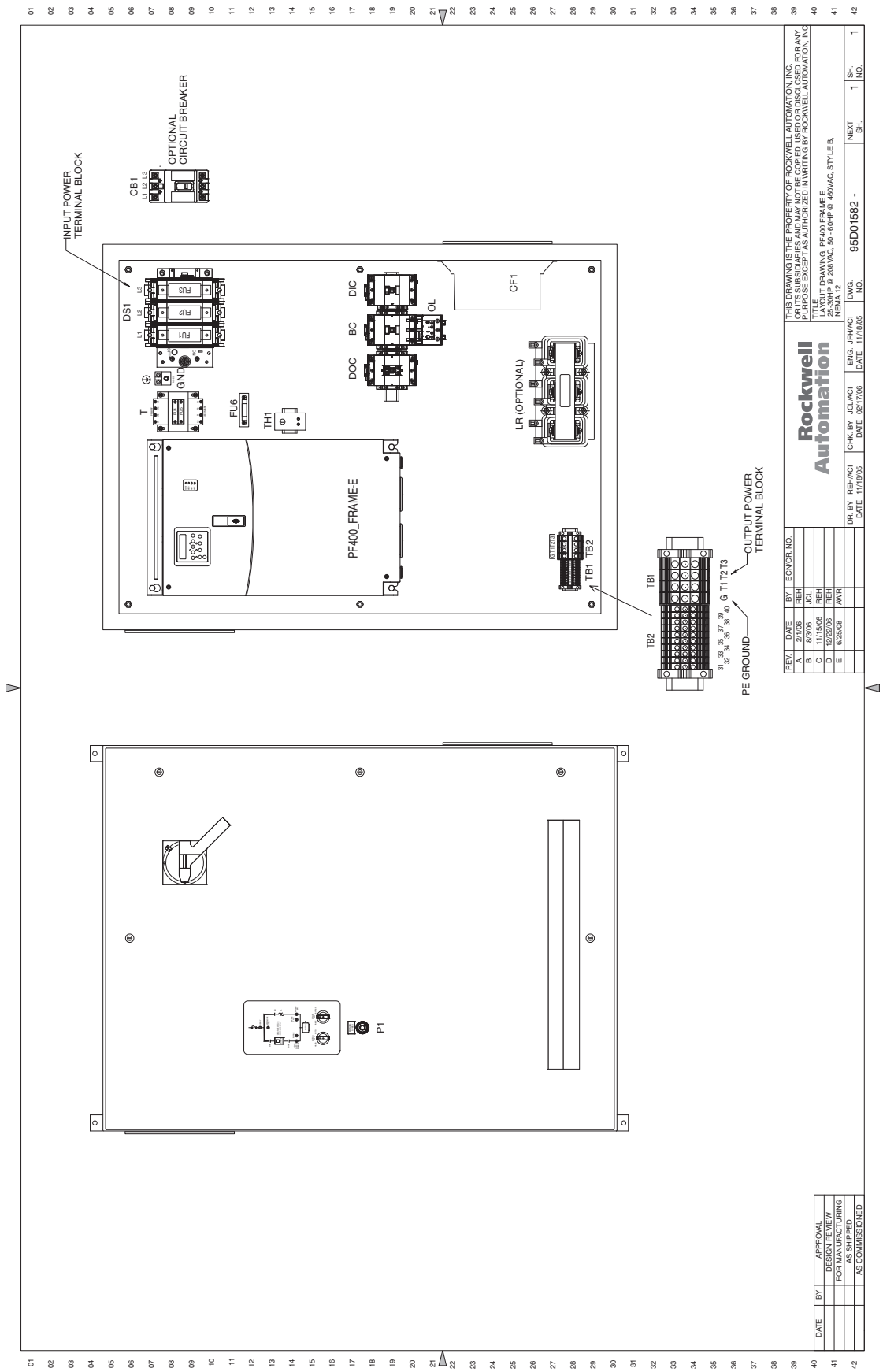


Figure 109 - 40…50 Hp, 208V AC and 75…100 Hp, 460V AC Drives - NEMA/UL Type 12

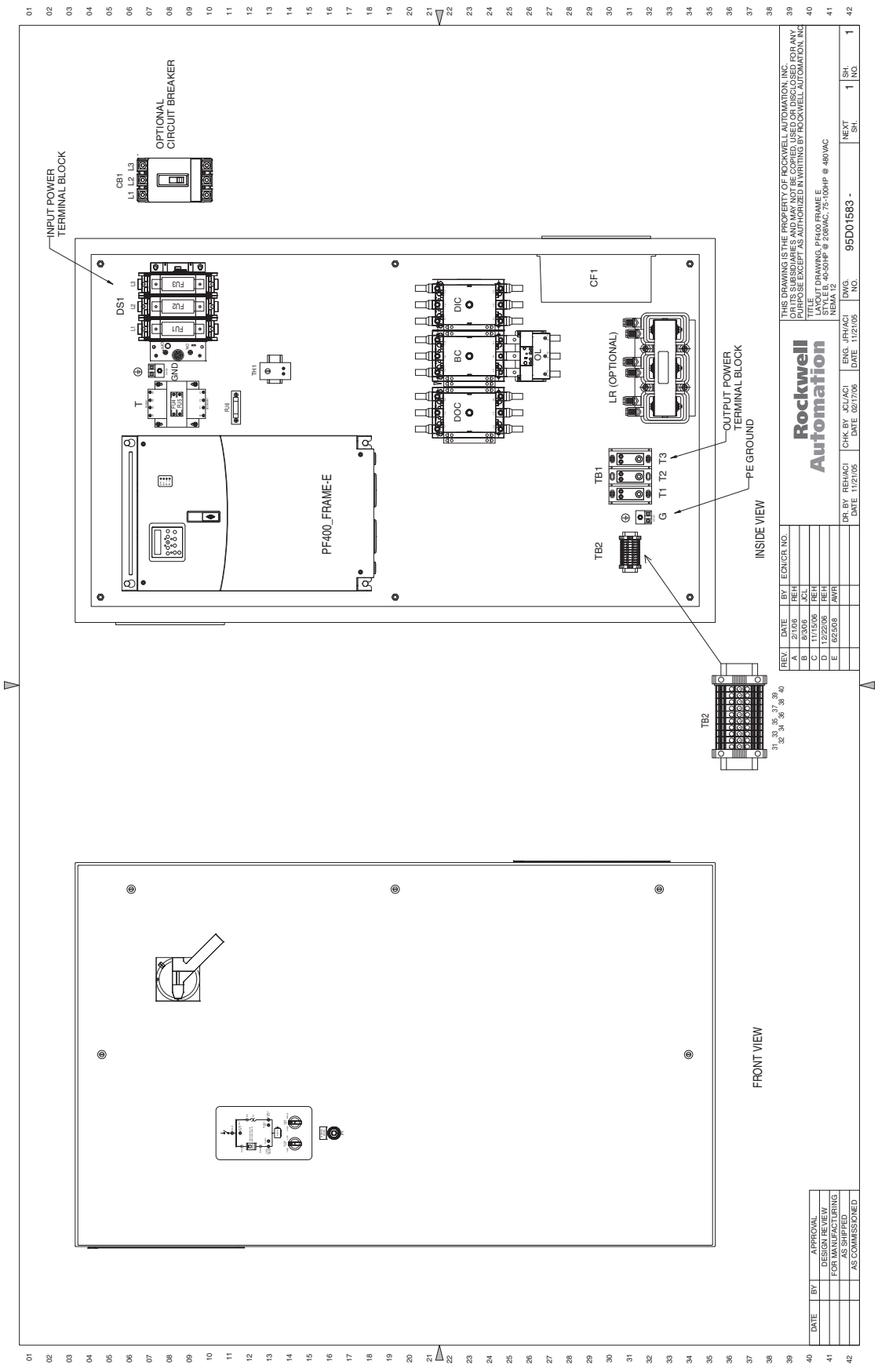


Figure 110 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 12

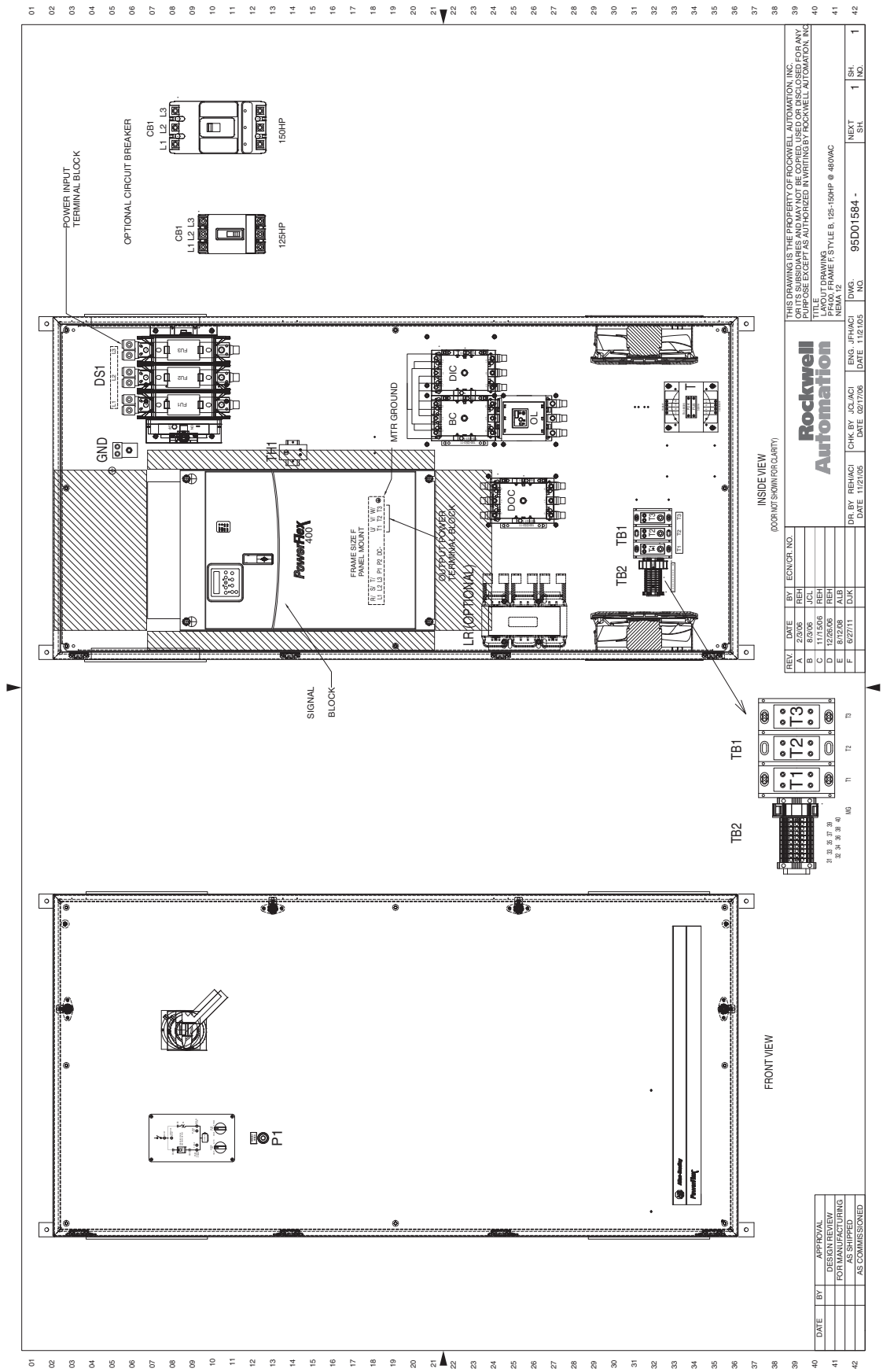


Figure 111 - 3.0…5.0 Hp, 460V AC Drives - NEMA/UL Type 4

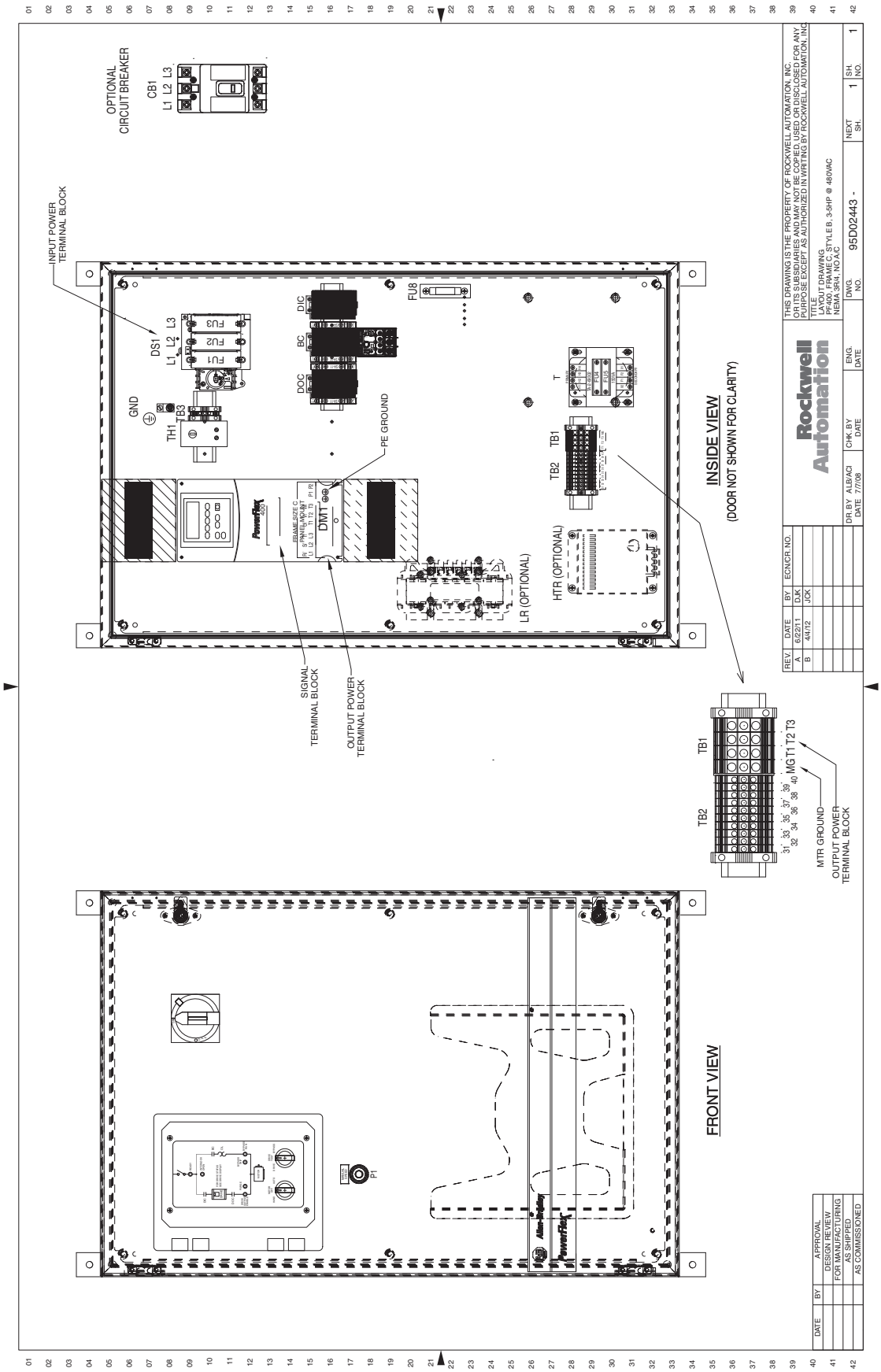


Figure 112 - 3.0…10 Hp, 208V AC and 7.5…20 Hp, 460V AC Drives - NEMA/UL Type 4

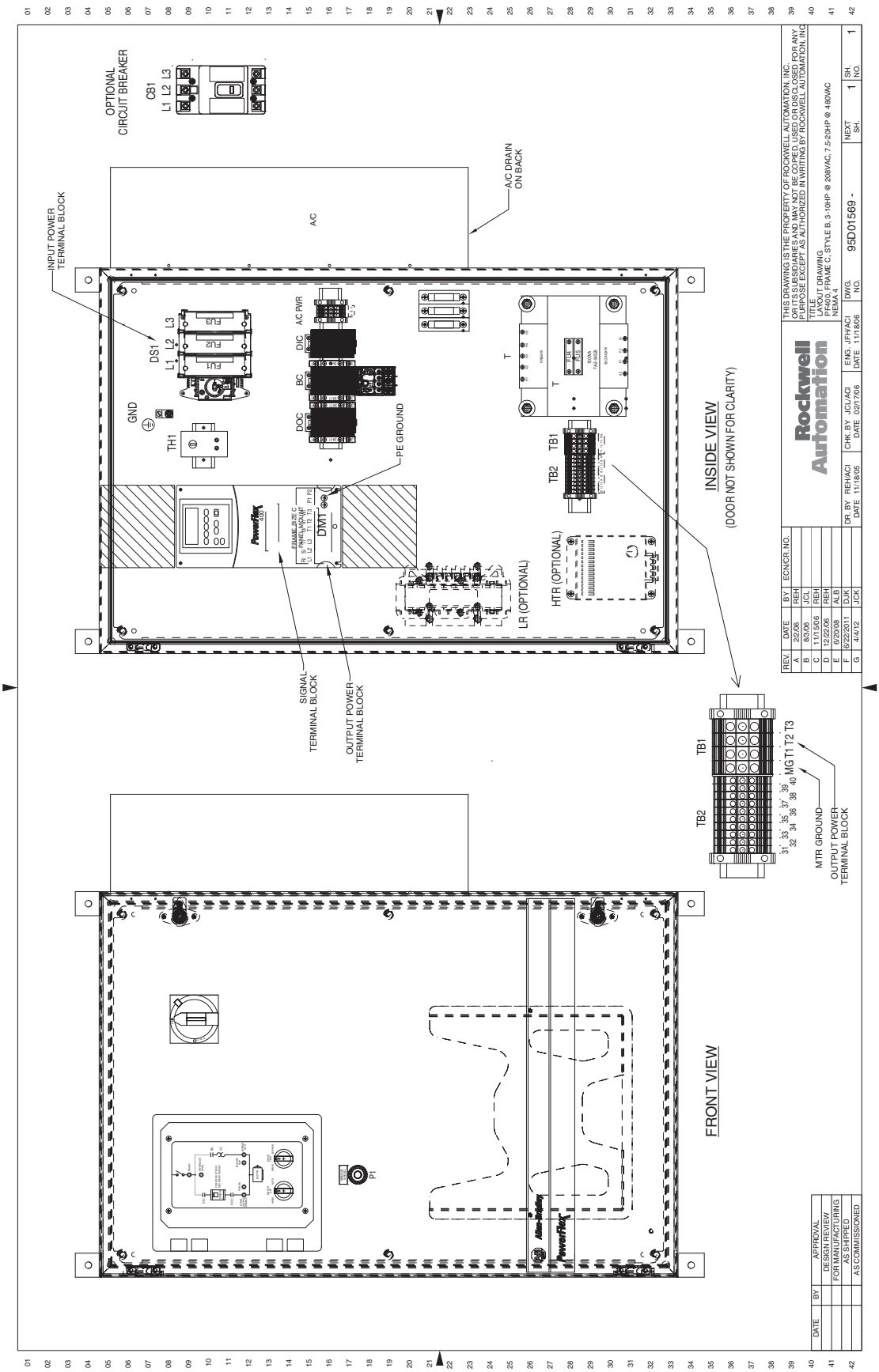


Figure 113 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 4

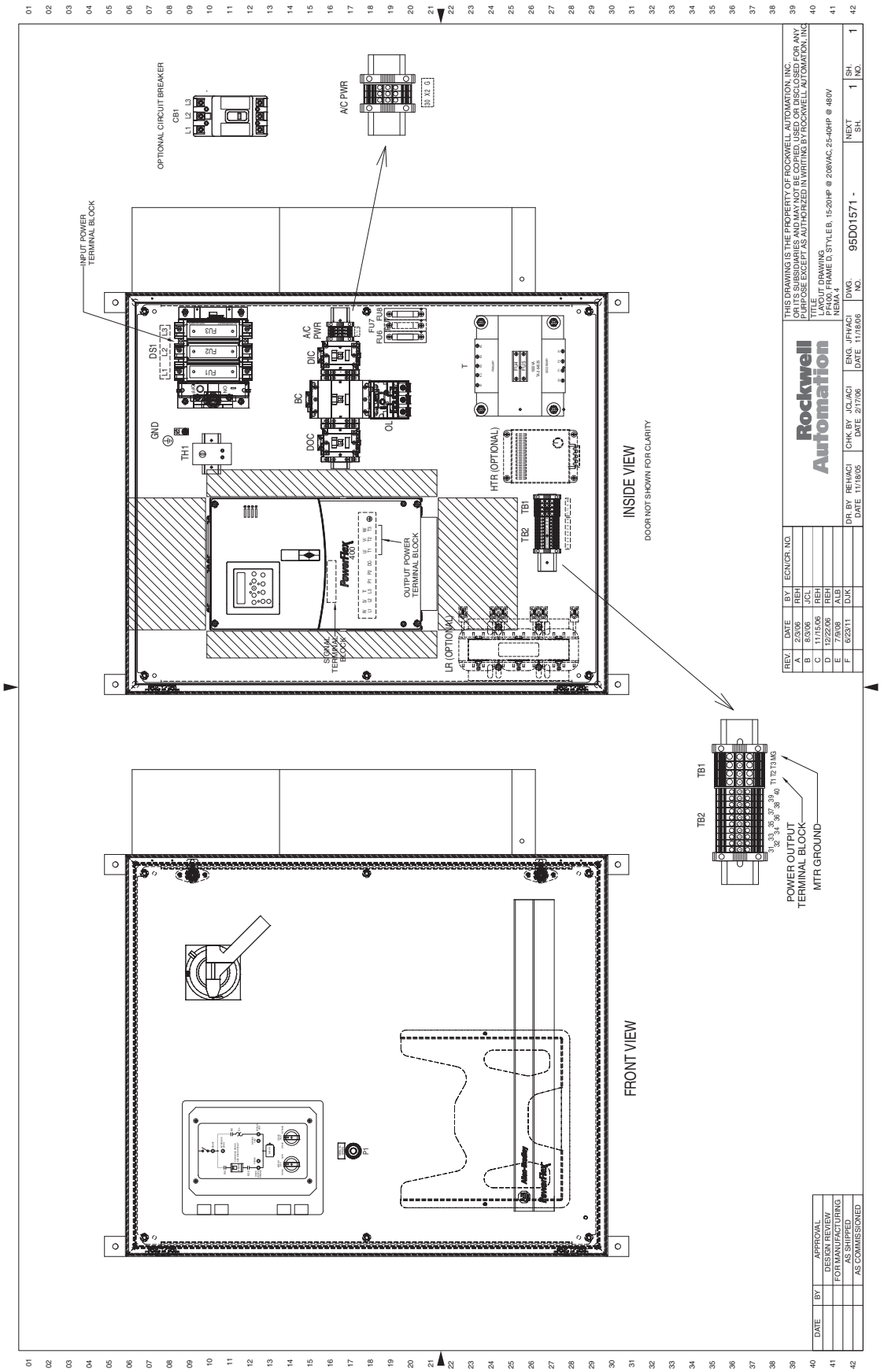


Figure 114 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 4

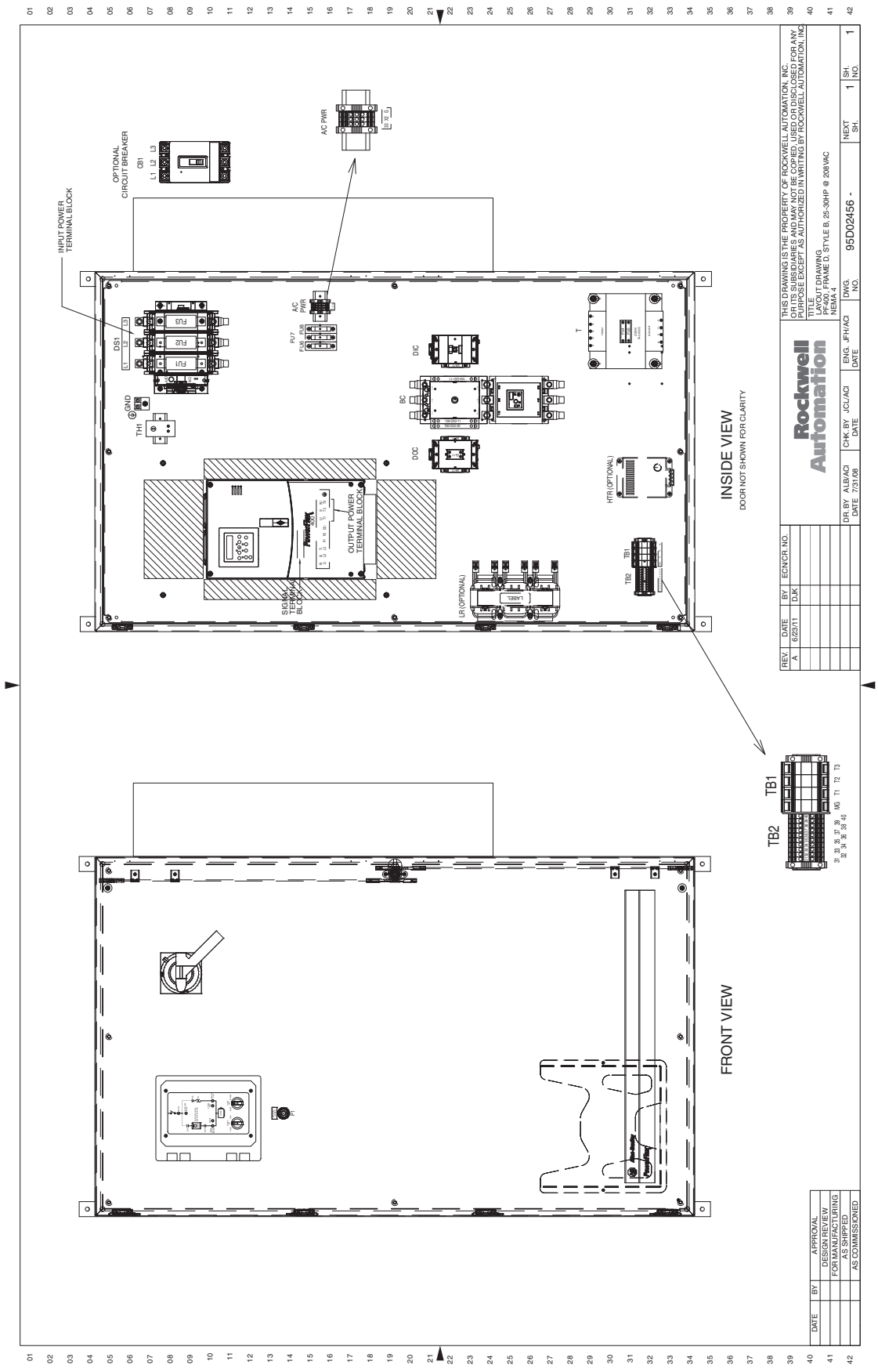


Figure 115 - 40…50 Hp, 208V AC Drives - NEMA/UL Type 4

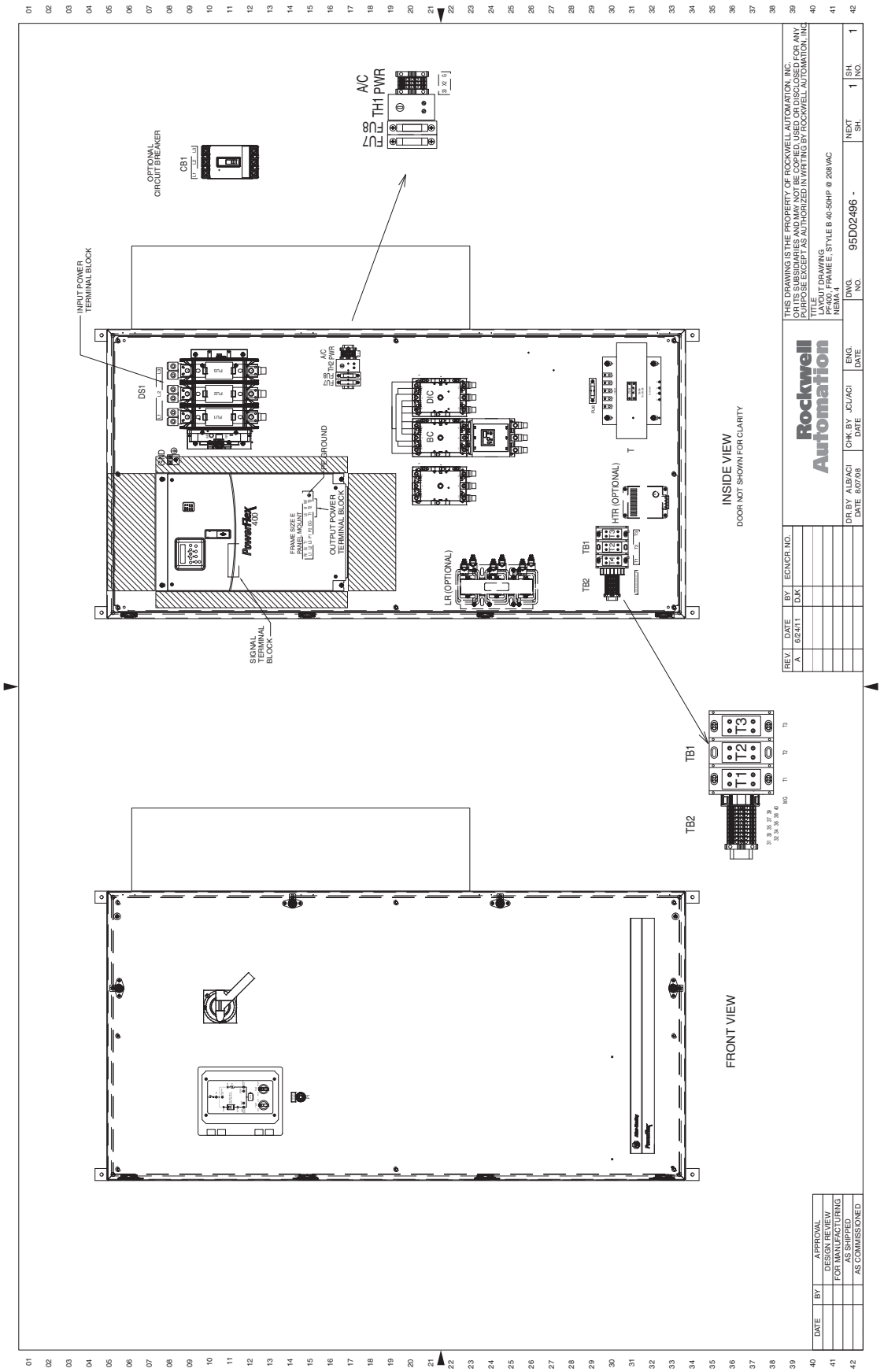


Figure 116 - 50…60 Hp, 460V AC Drives - NEMA/UL Type 4

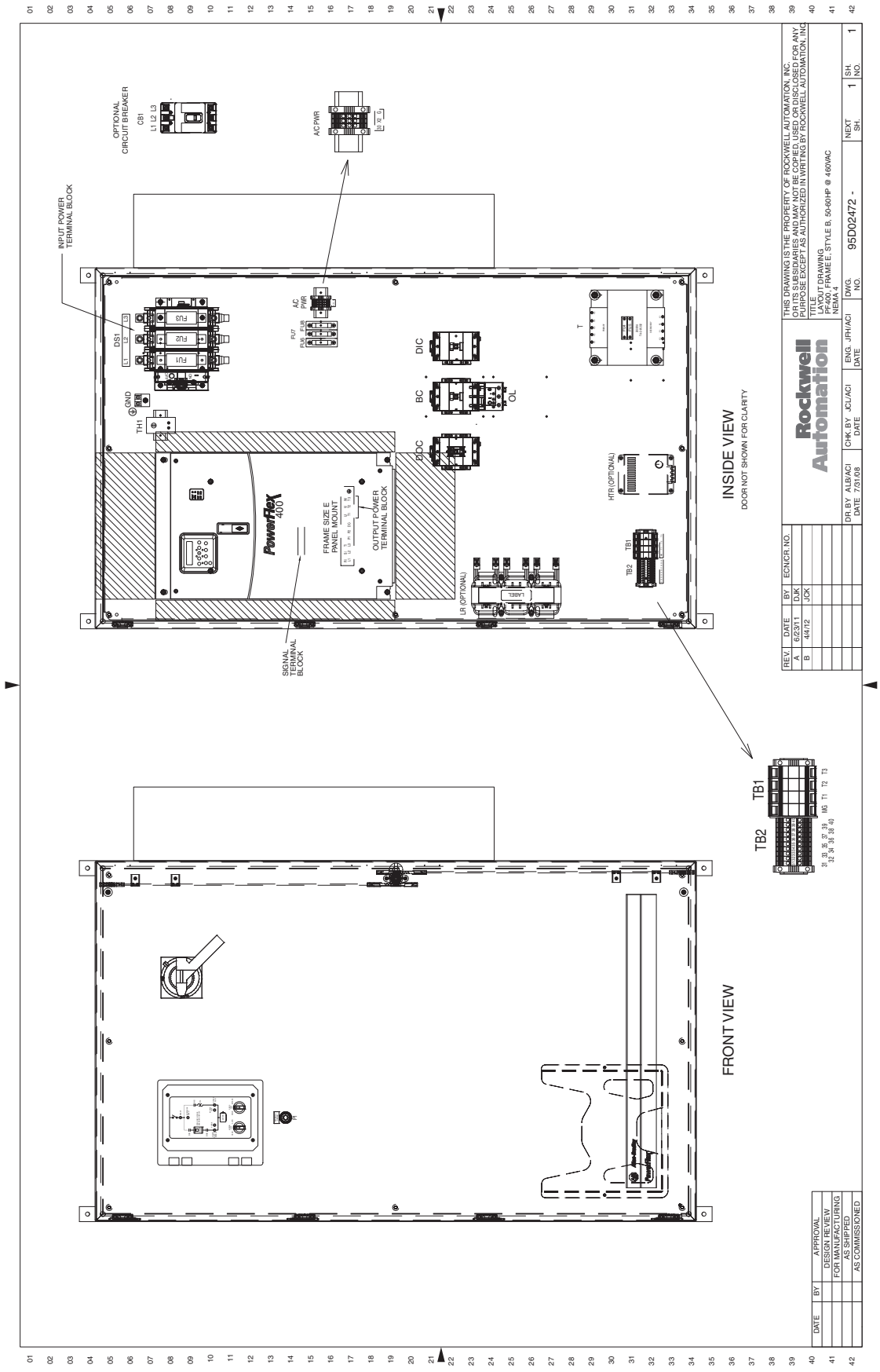


Figure 117 - 75…100 Hp, 460V AC Drives - NEMA/UL Type 4

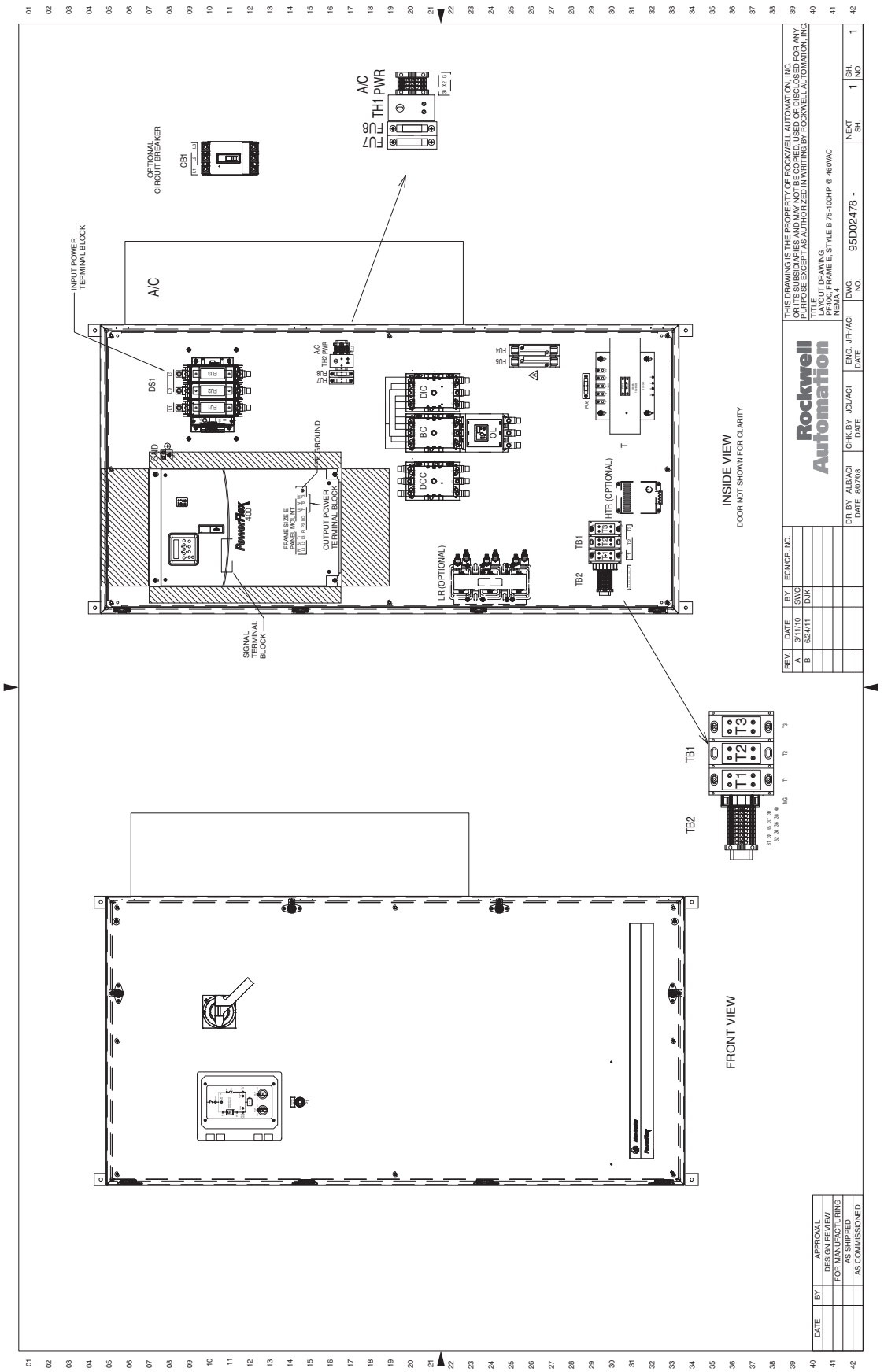


Figure 118 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 4

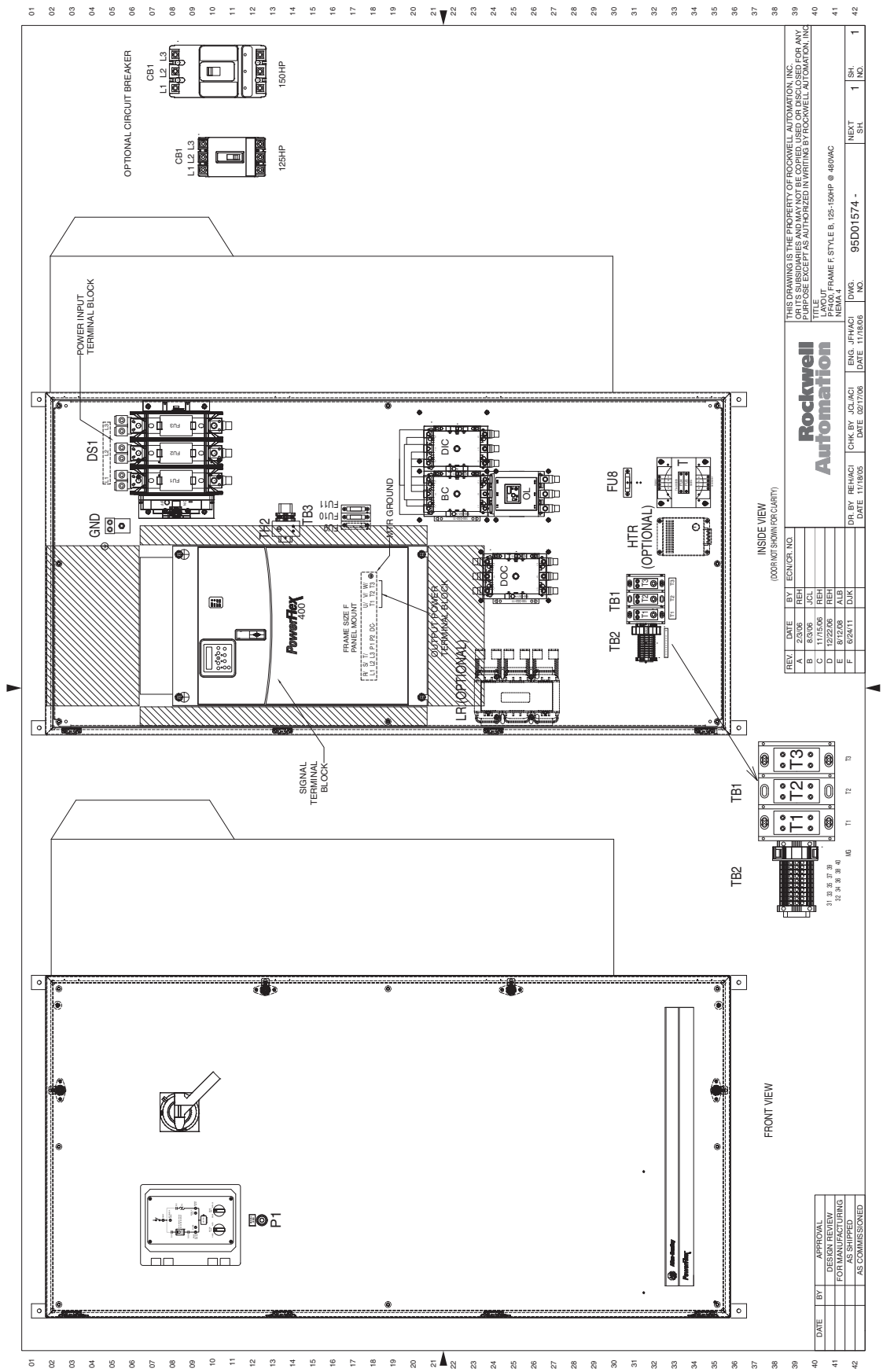


Figure 119 - 3.0…10 Hp, 208V AC and 3.0…20 Hp, 460V AC Drives - NEMA/UL Type 3R

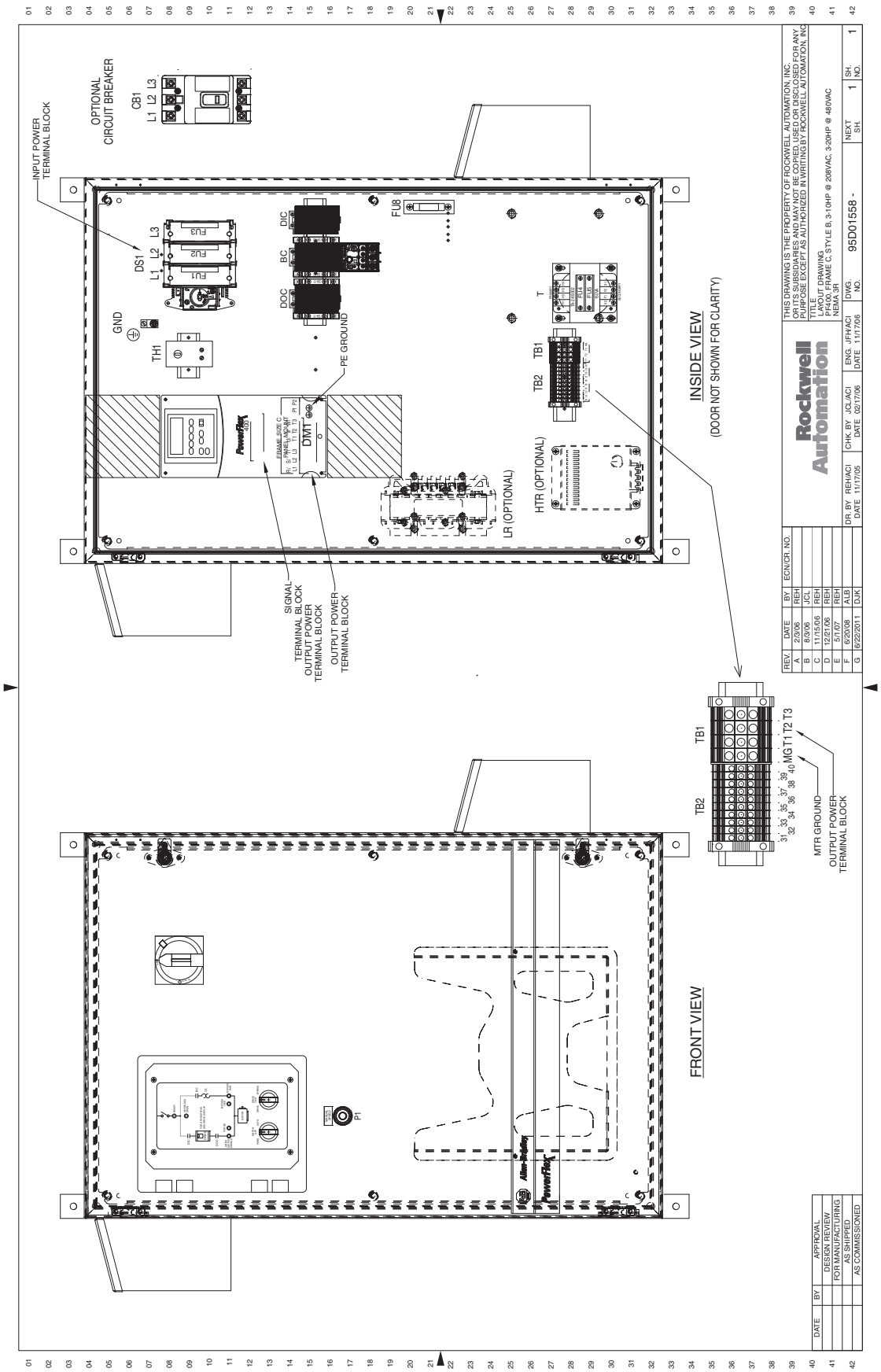


Figure 120 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 3R

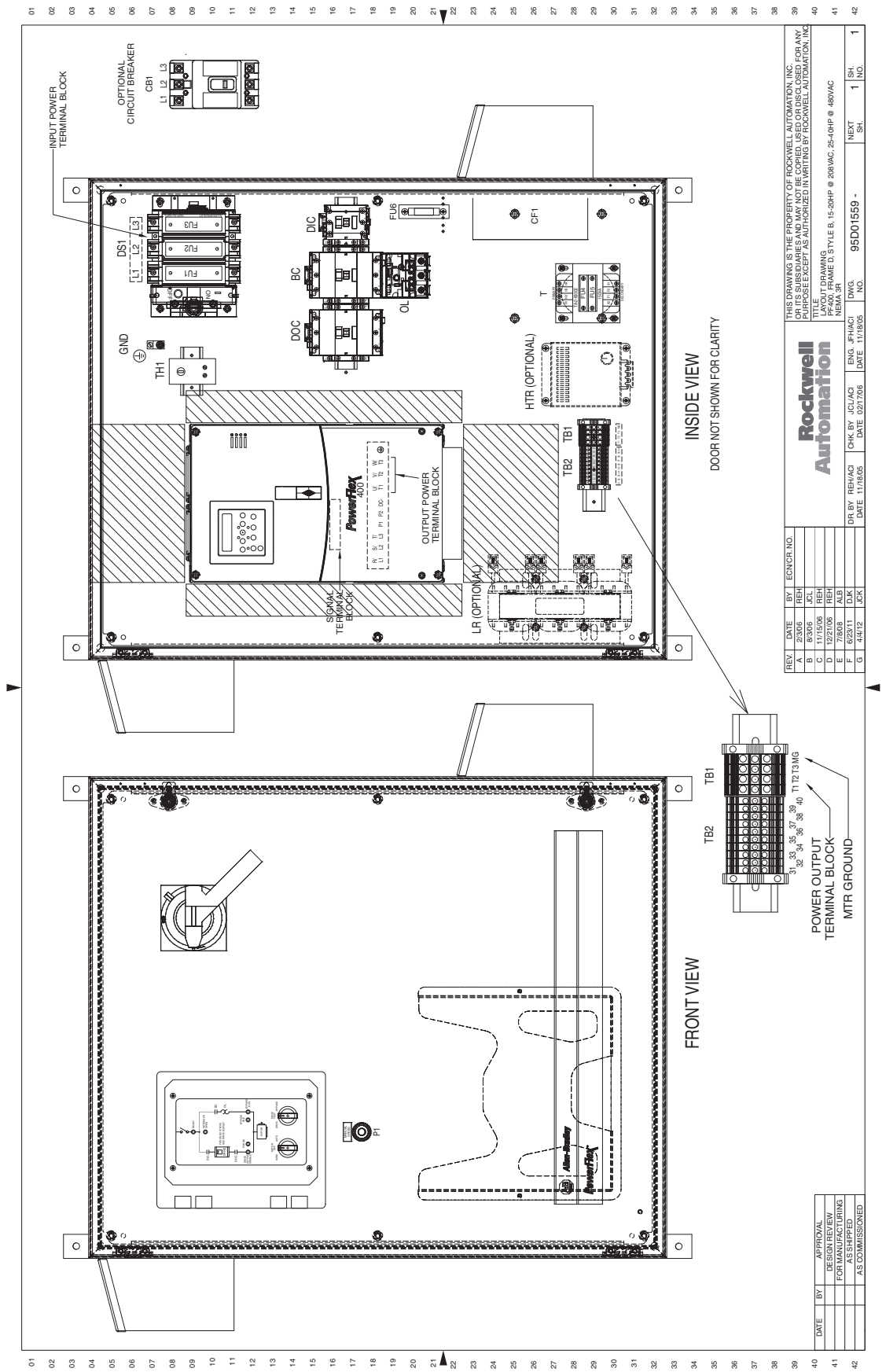


Figure 121 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 3R

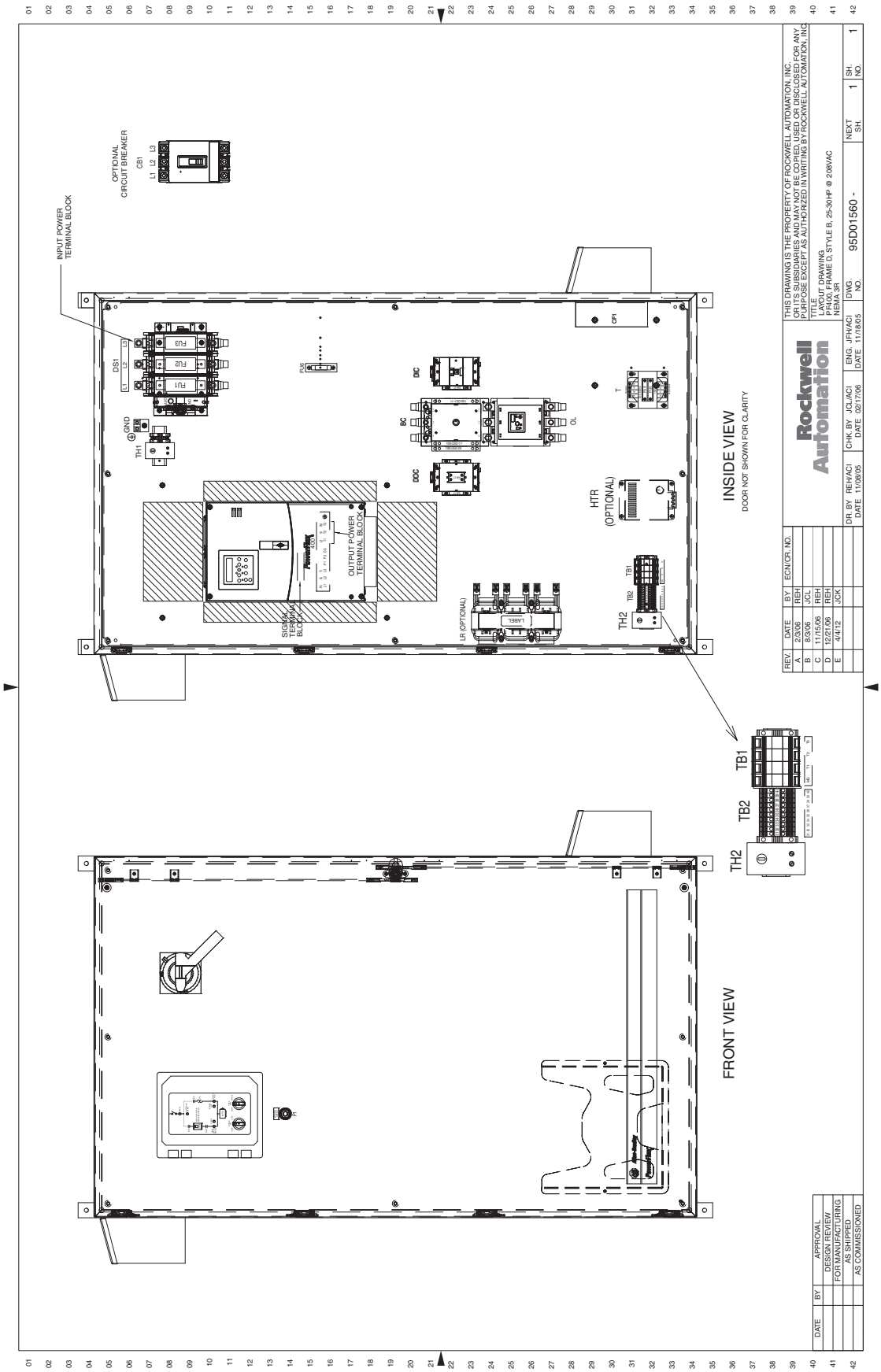


Figure 122 - 40…50 Hp, 208V AC Drives - NEMA/UL Type 3R

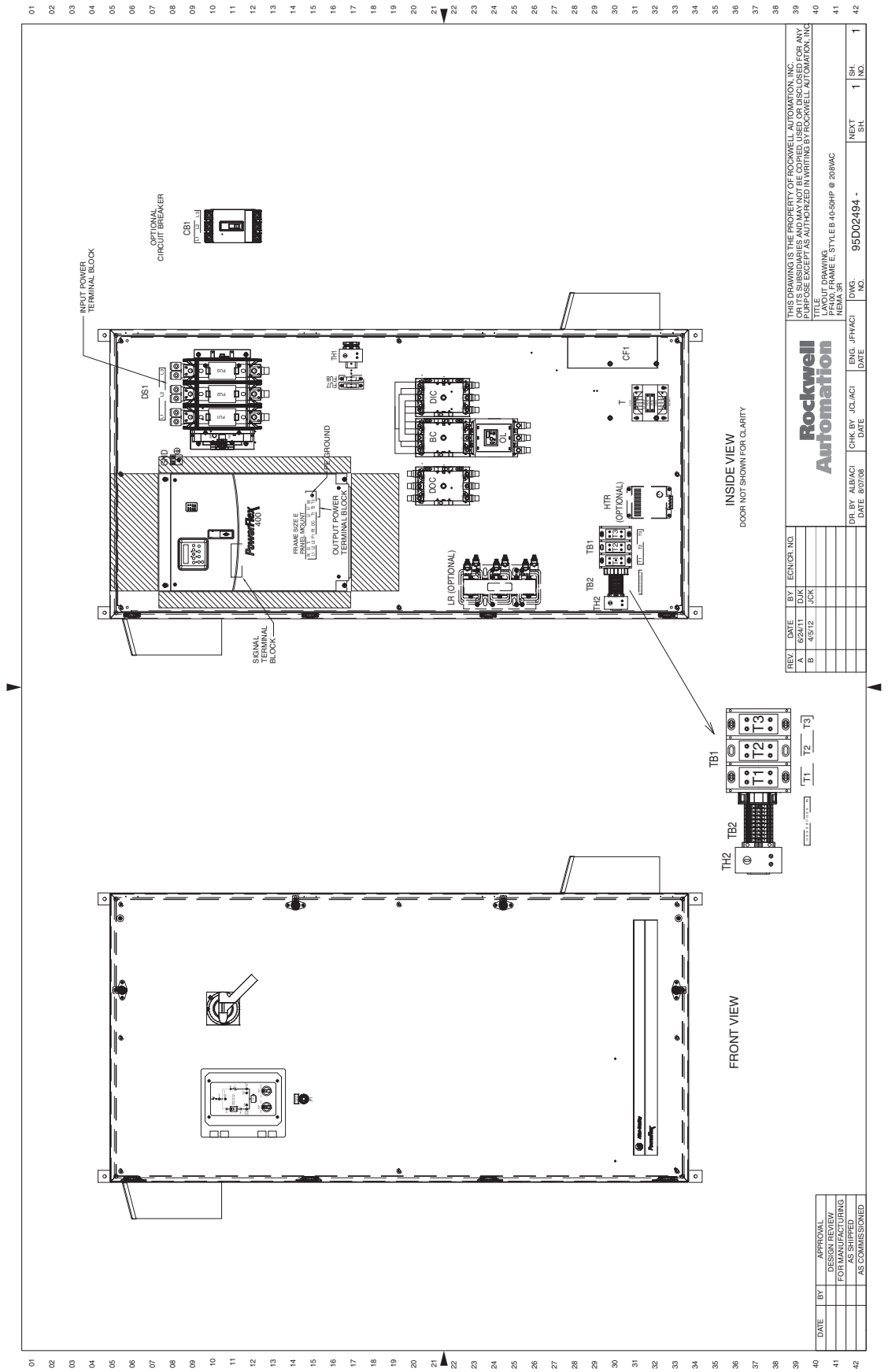


Figure 123 - 50…60 Hp, 460V AC Drives - NEMA/UL Type 3R

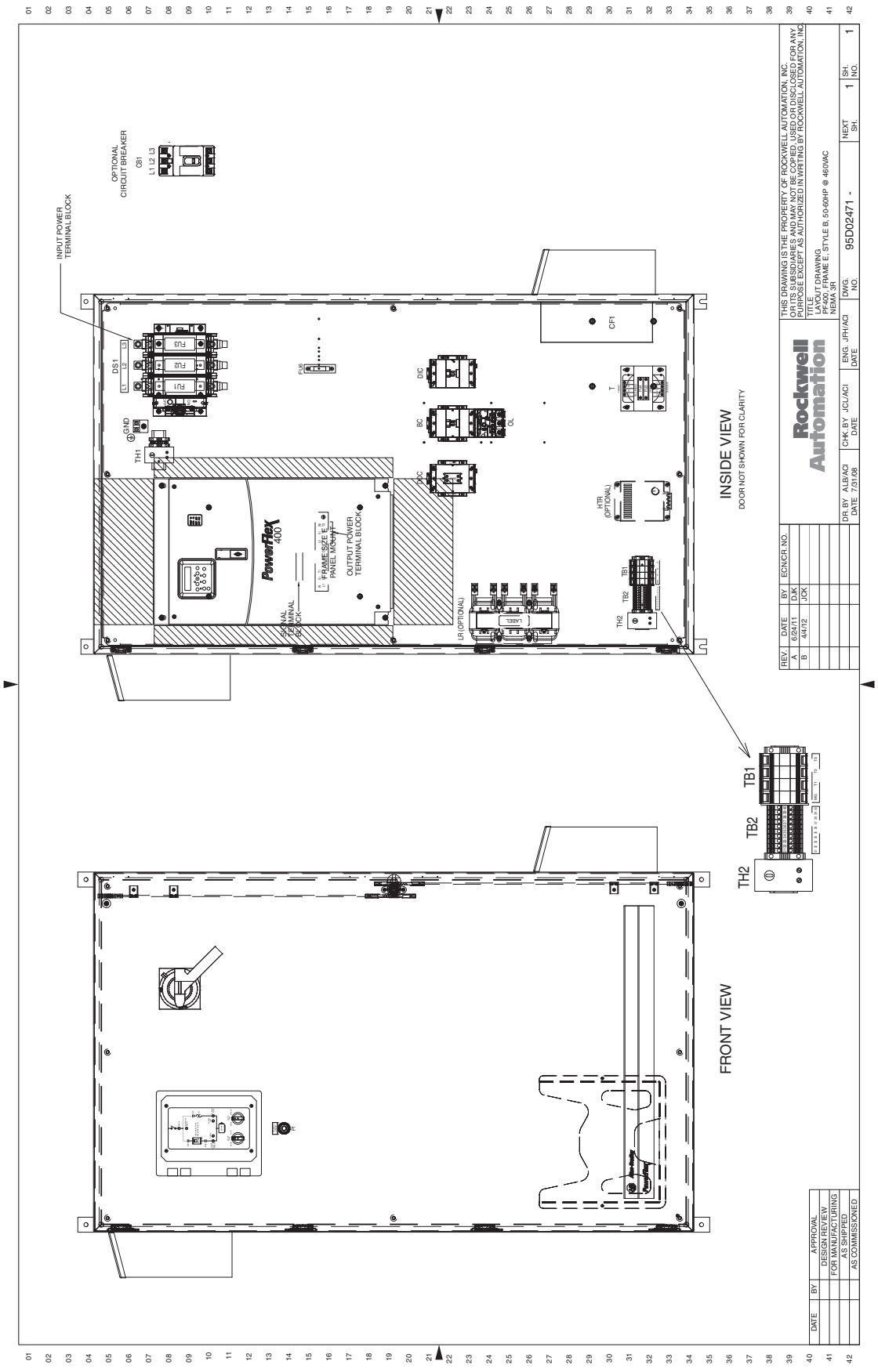


Figure 124 - 75…100 Hp, 460V AC Drives - NEMA/UL Type 3R

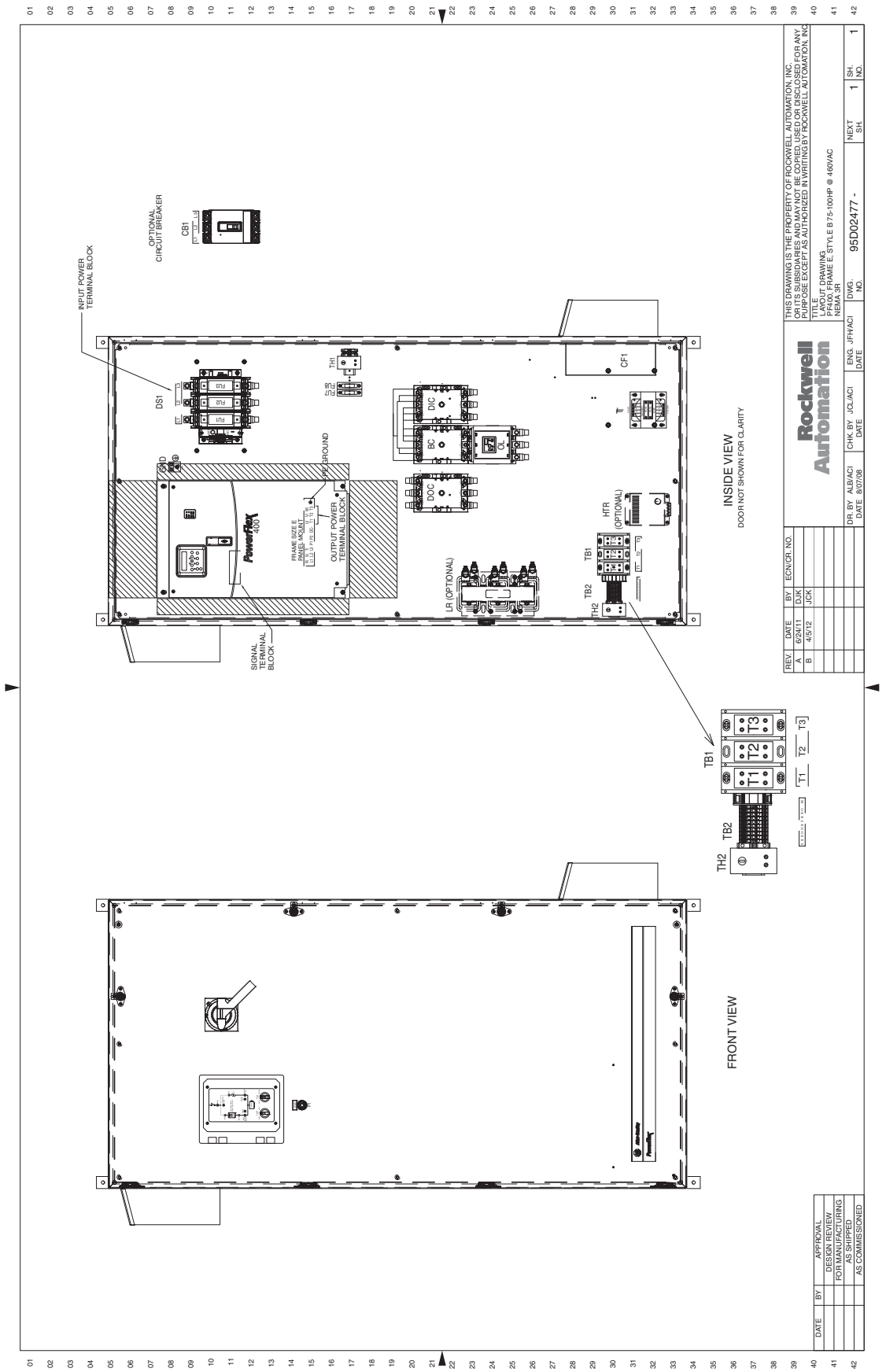
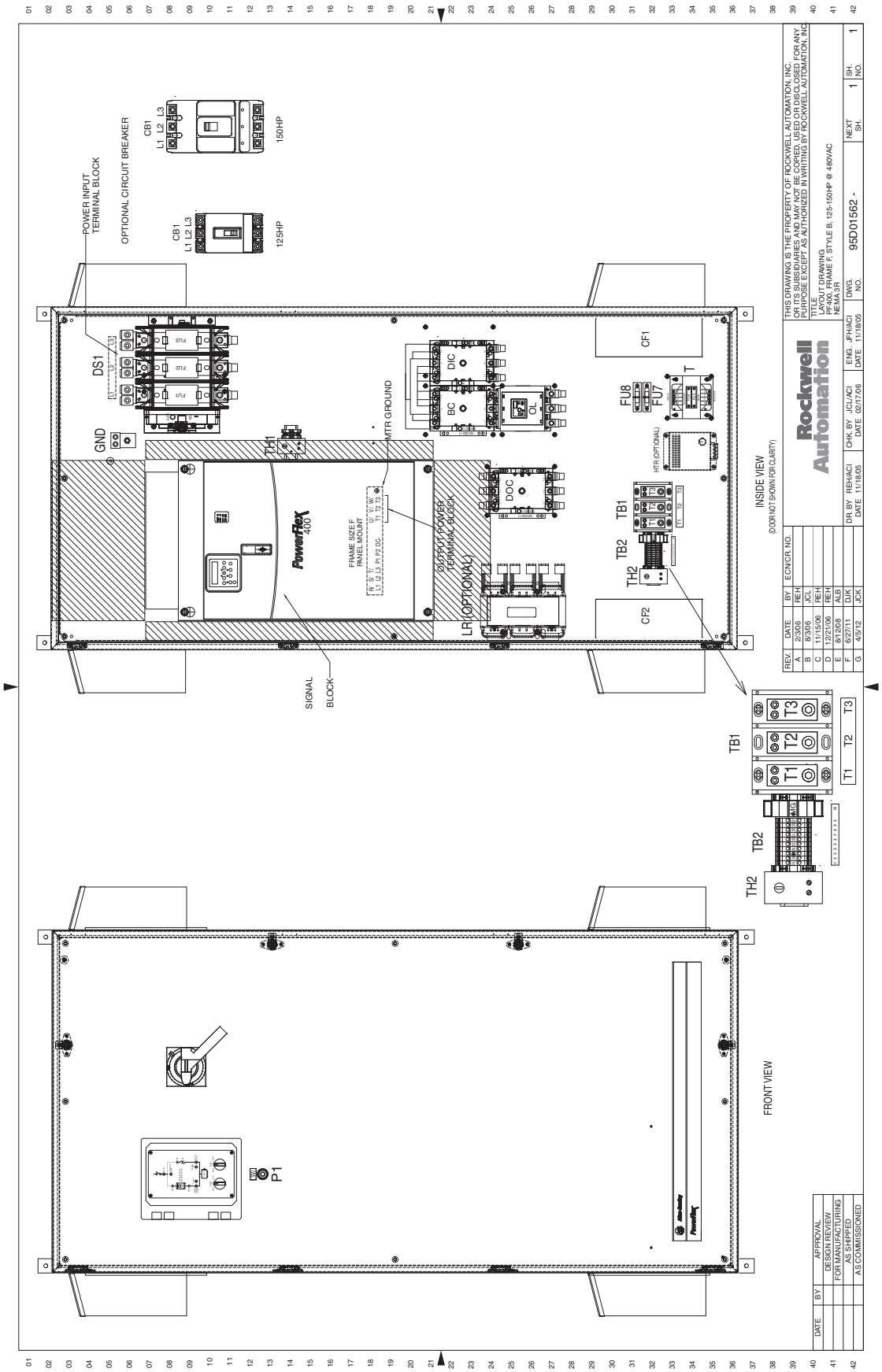


Figure 125 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 3R



Outline Drawings

Figure 126 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives - NEMA/UL Type 1

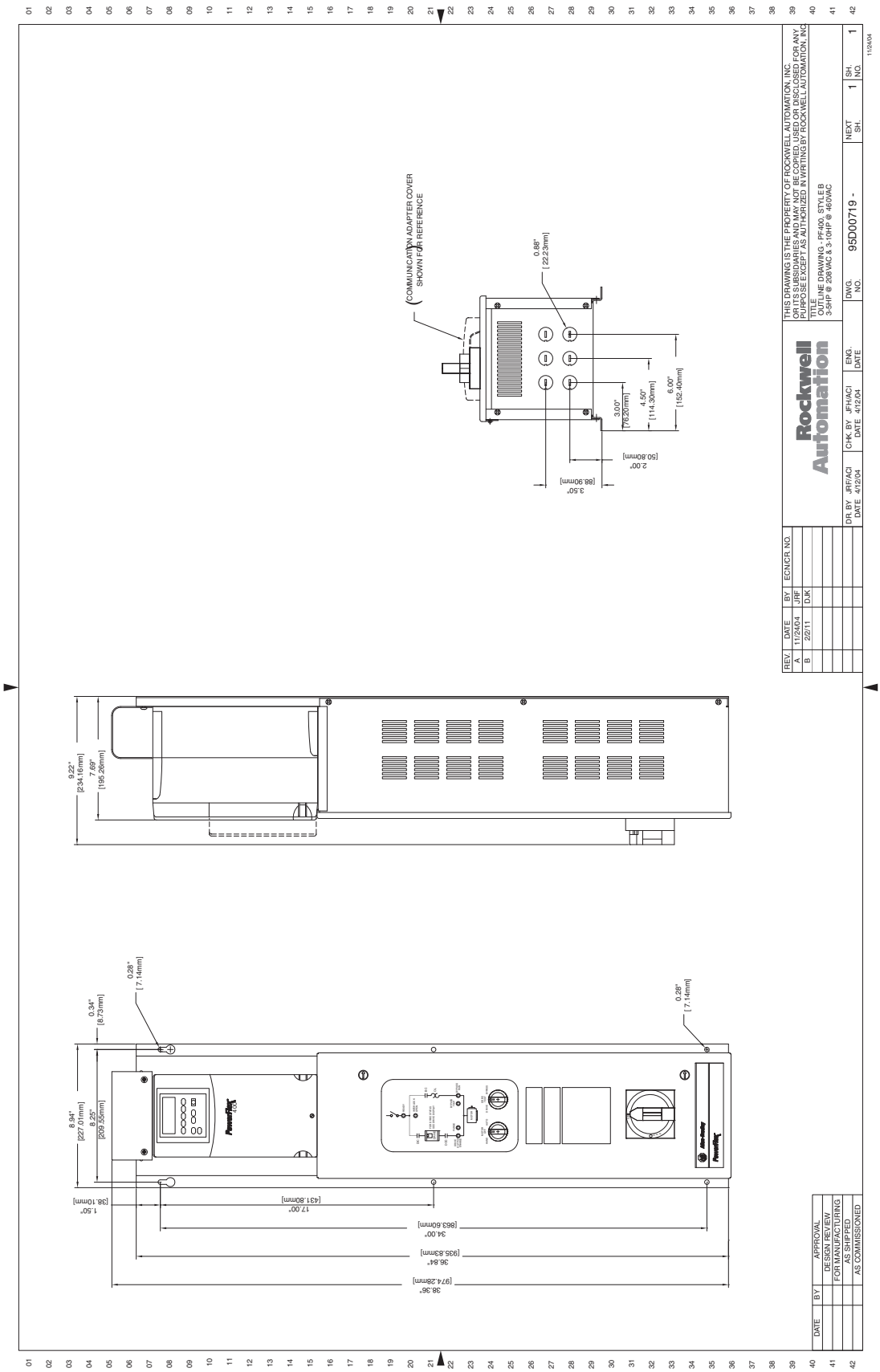


Figure 127 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives - NEMA/UL Type 1

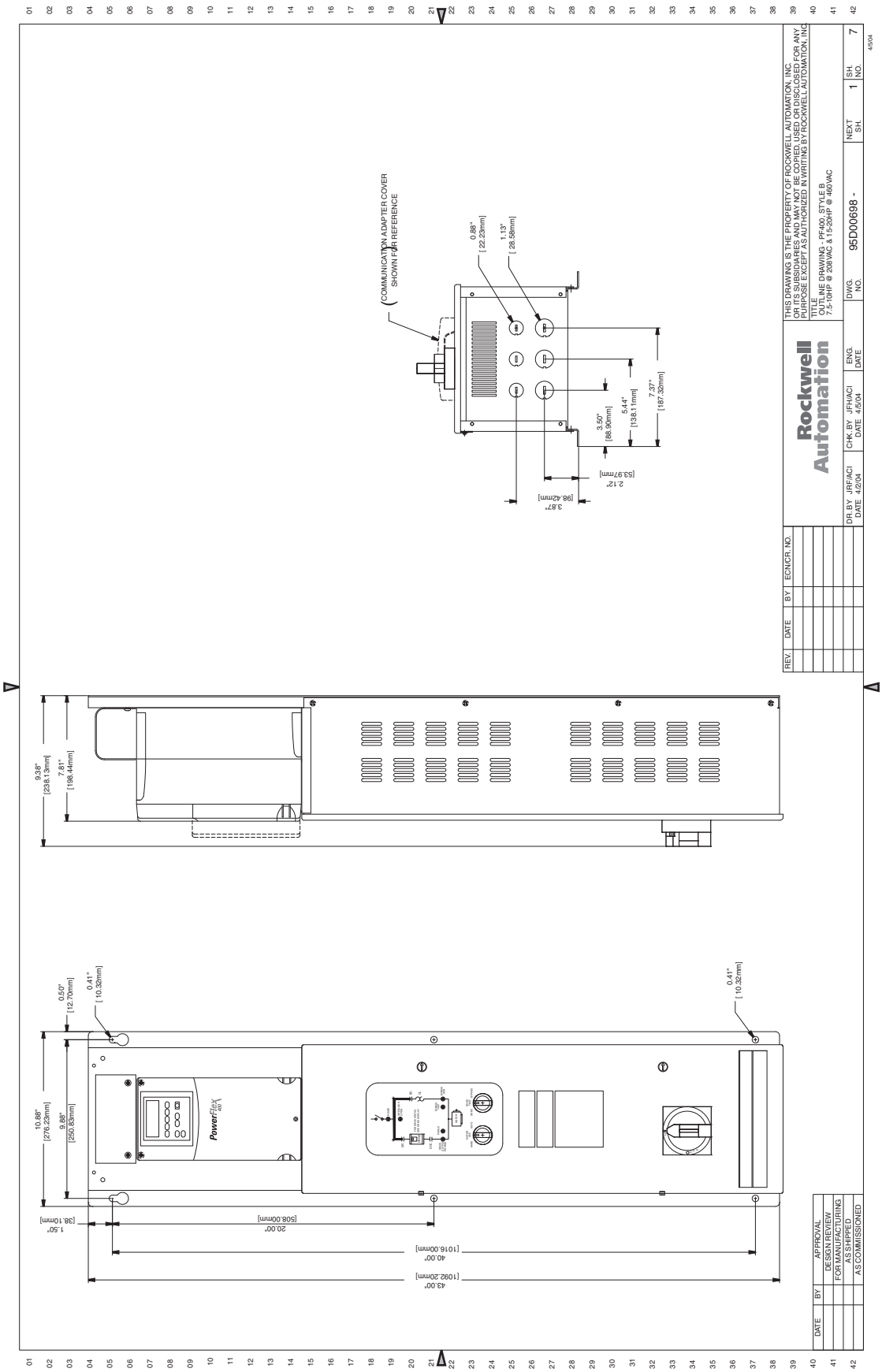


Figure 128 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives - NEMA/UL Type 1

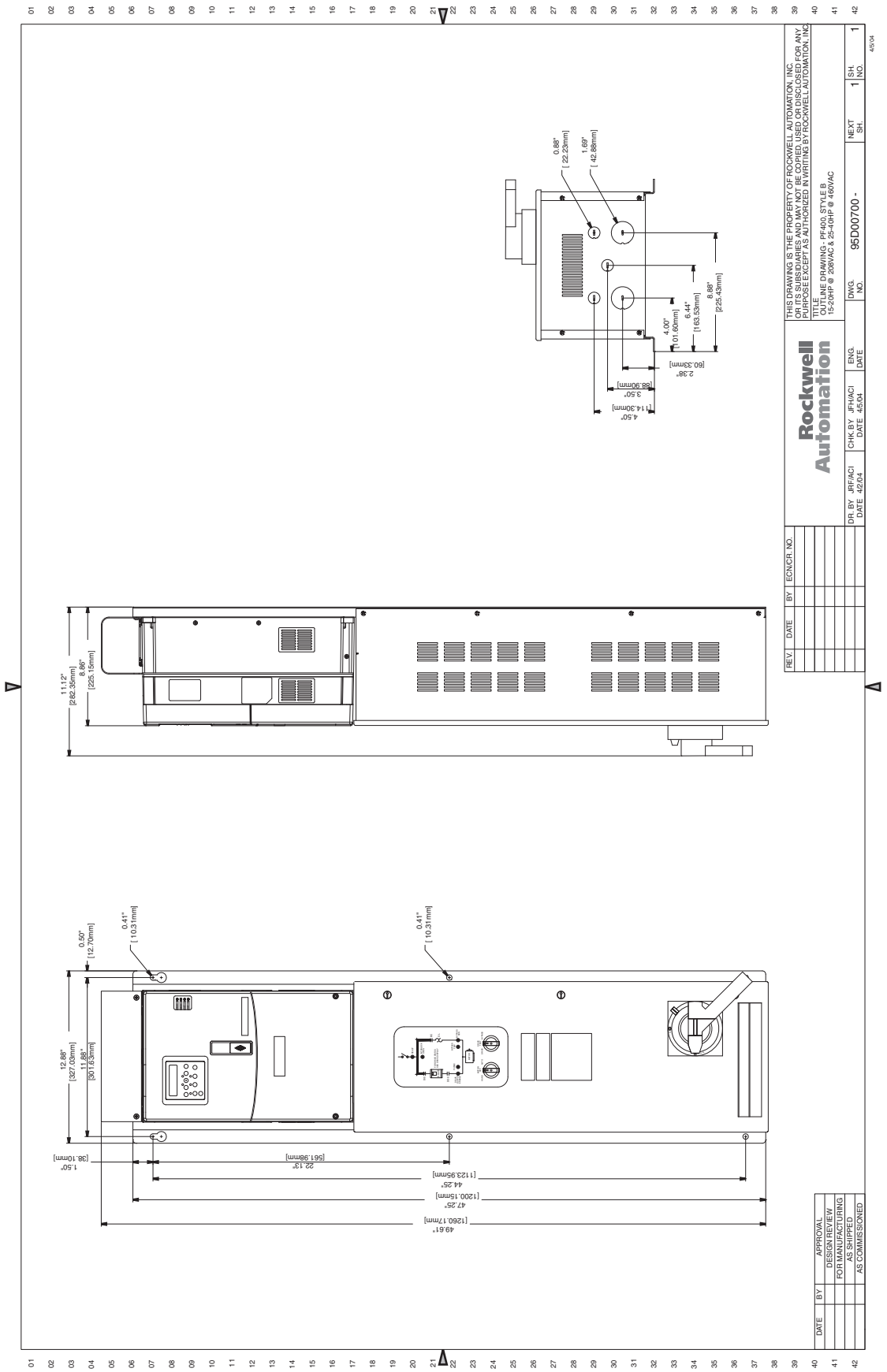


Figure 129 - 25…30 Hp, 208V AC Drives - NEMA/UL Type 1

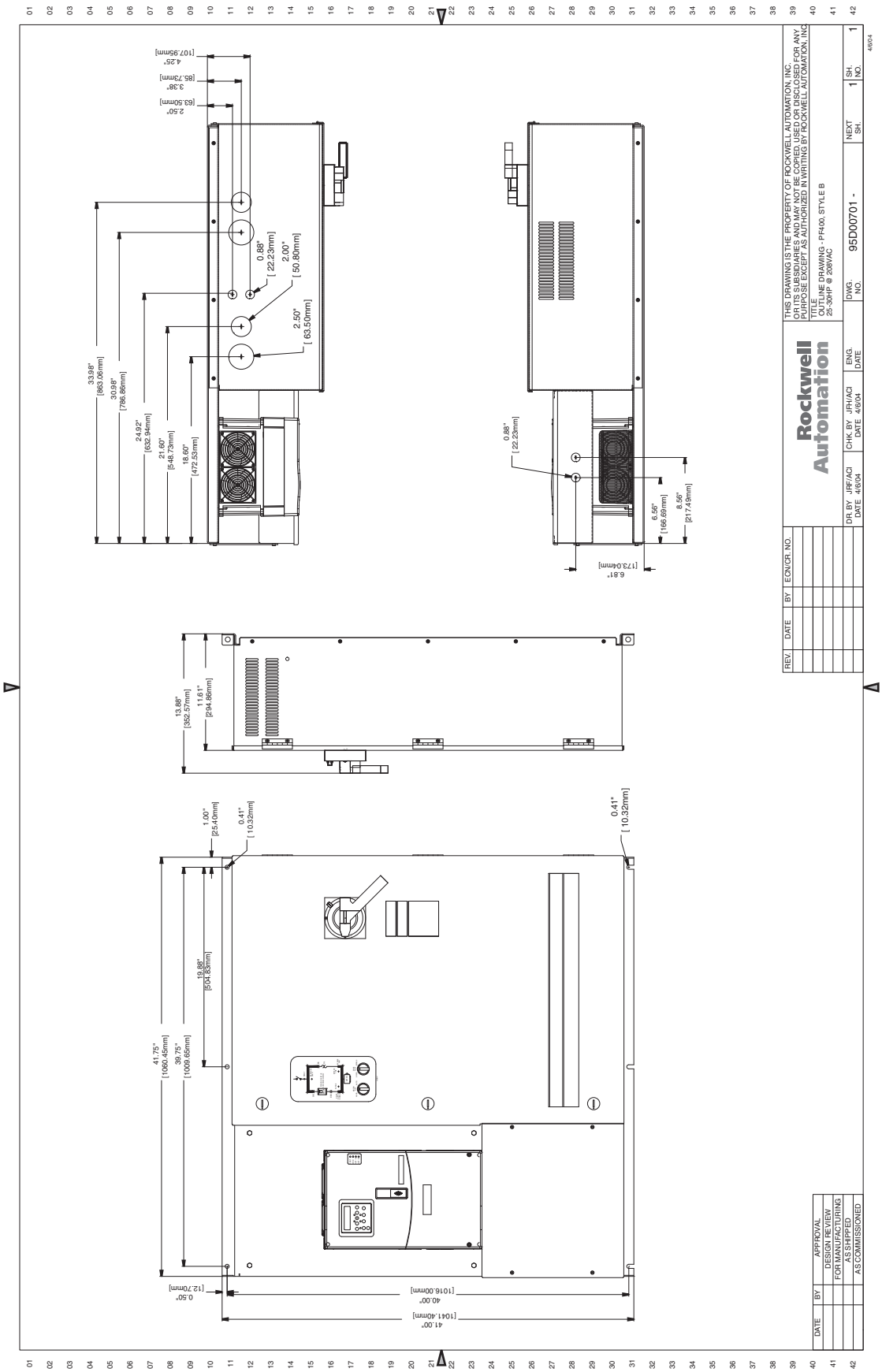


Figure 130 - 40 Hp, 208V AC and 50…100 Hp, 460V AC Drives - NEMA/UL Type 1

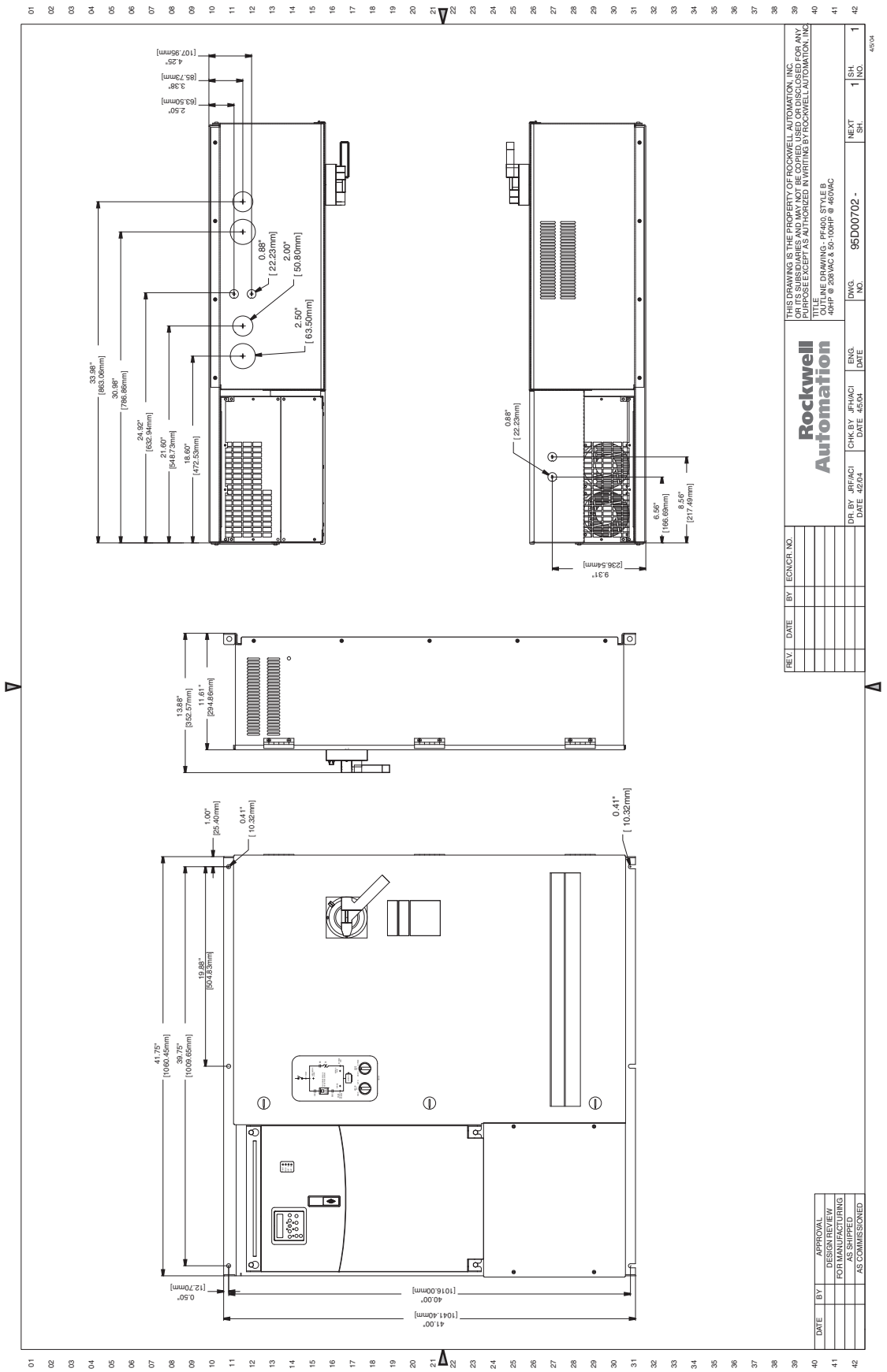


Figure 131 - 50 Hp, 208V AC Drives - NEMA/UL Type 1

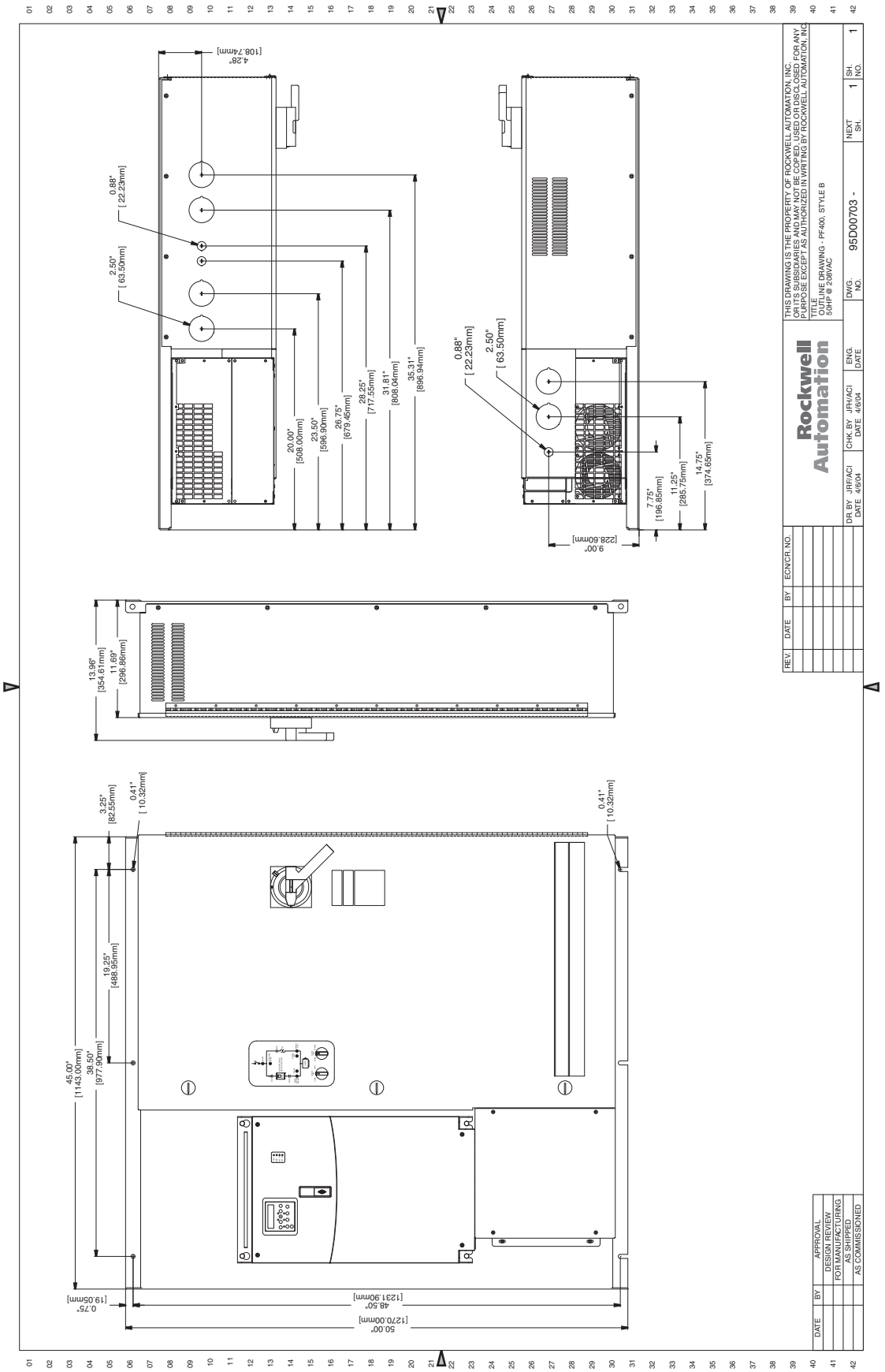


Figure 132 - 125…150 Hp, 460V AC Drives - NEMA/UL Type 1

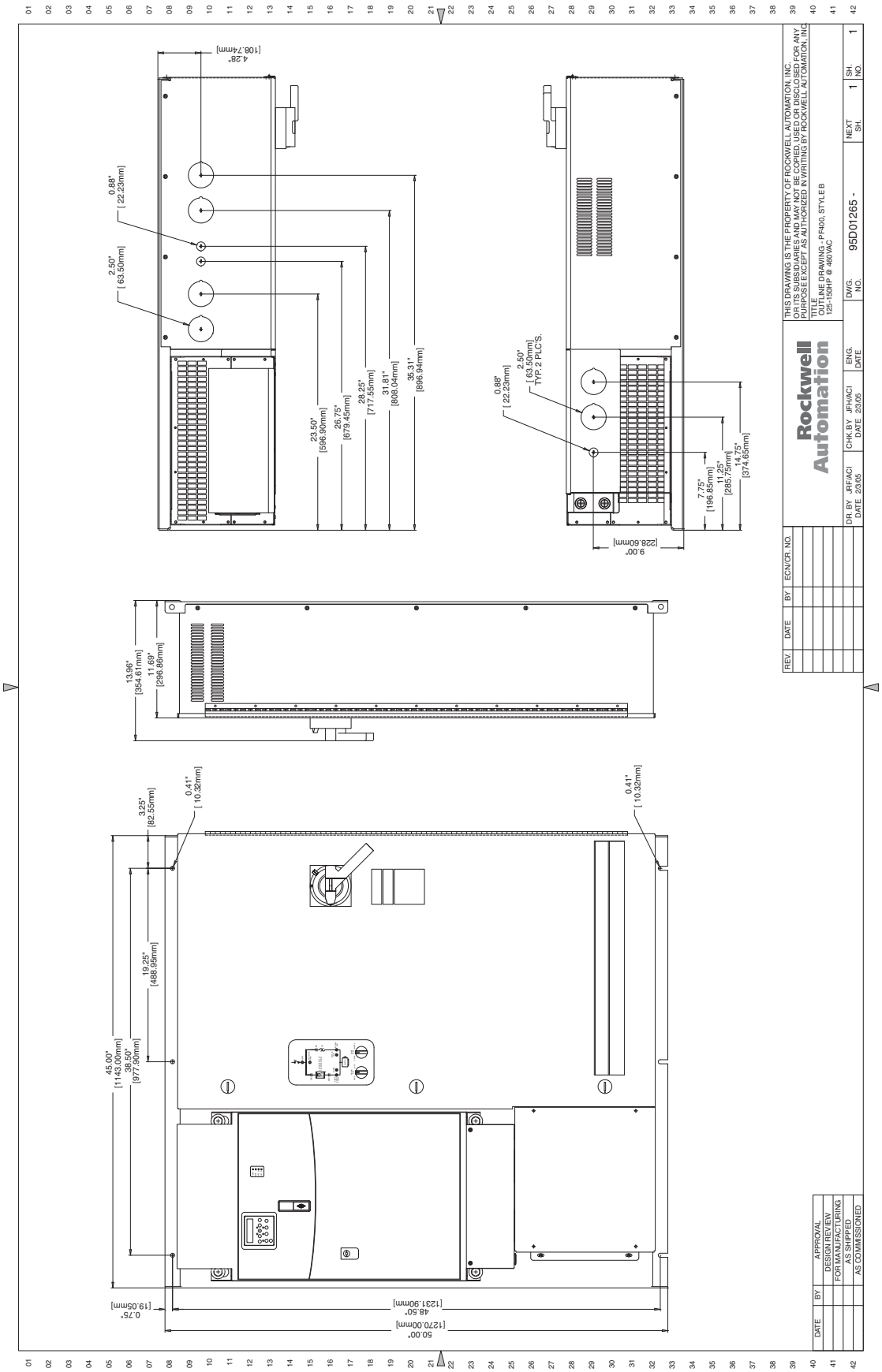


Figure 133 - 200…250 Hp, 460V AC Drives - NEMA/UL Type 1

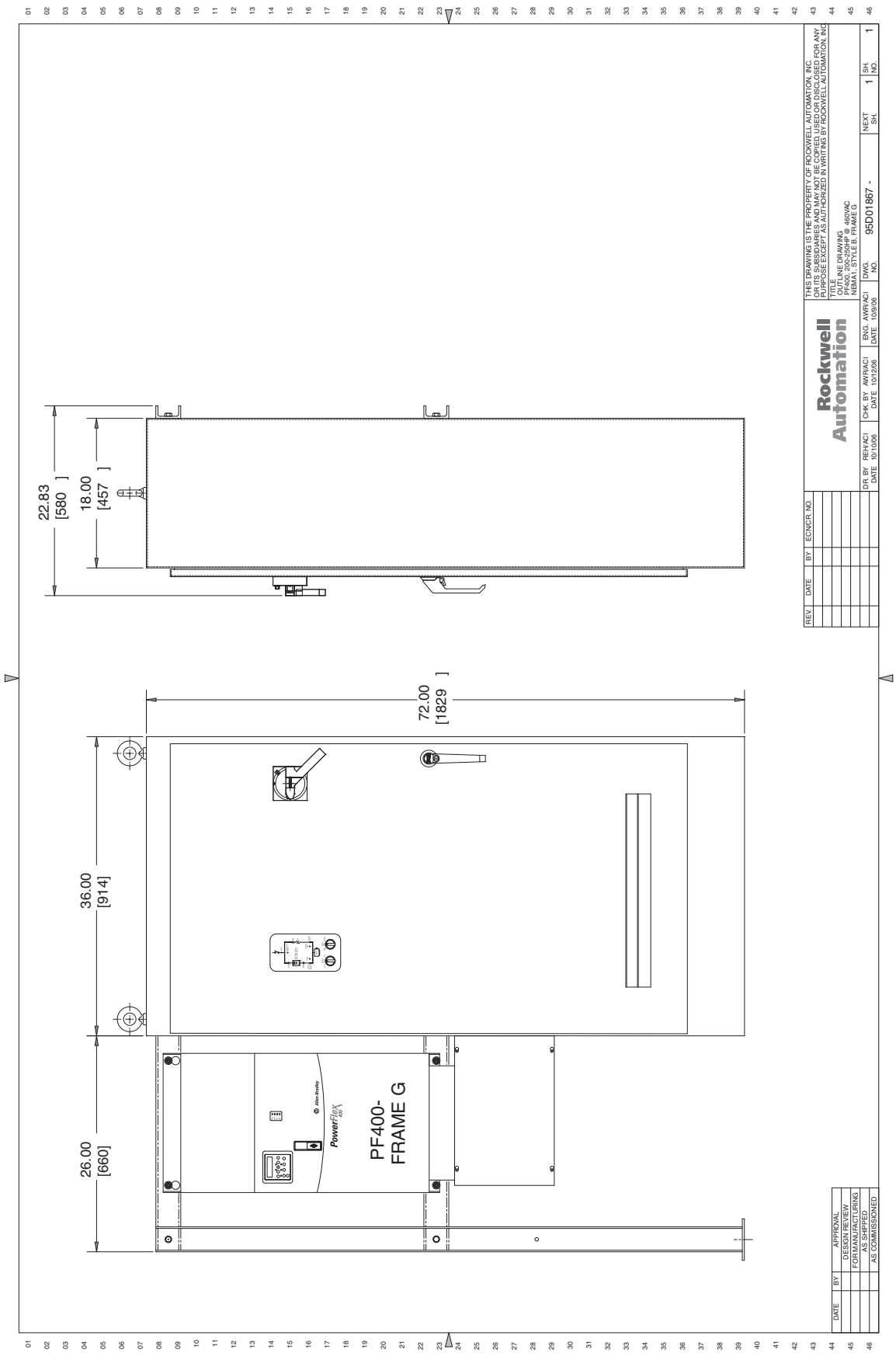


Figure 134 - 300…350 Hp, 460V AC Drives - NEMA/UL Type 1

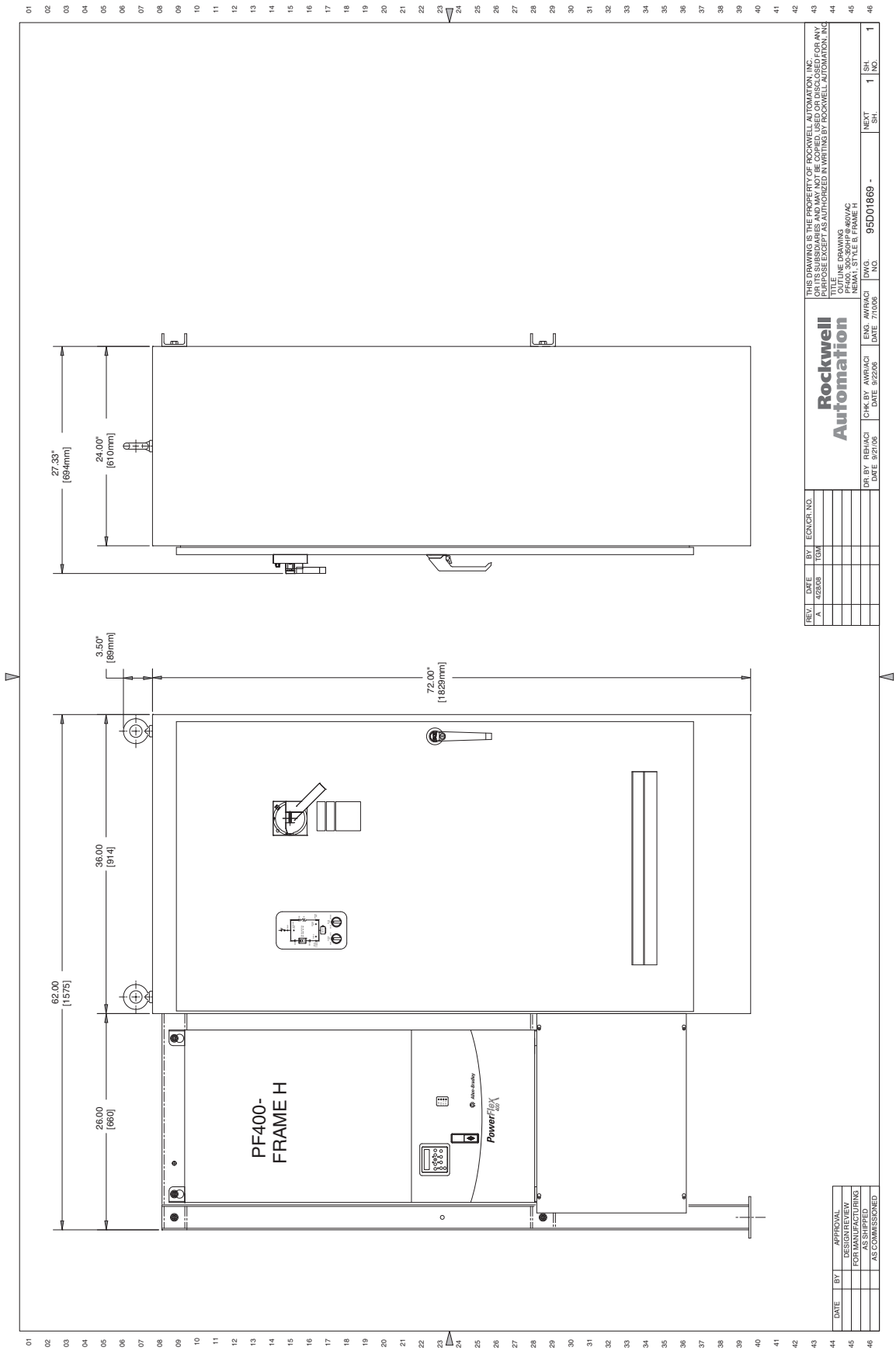


Figure 135 - 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

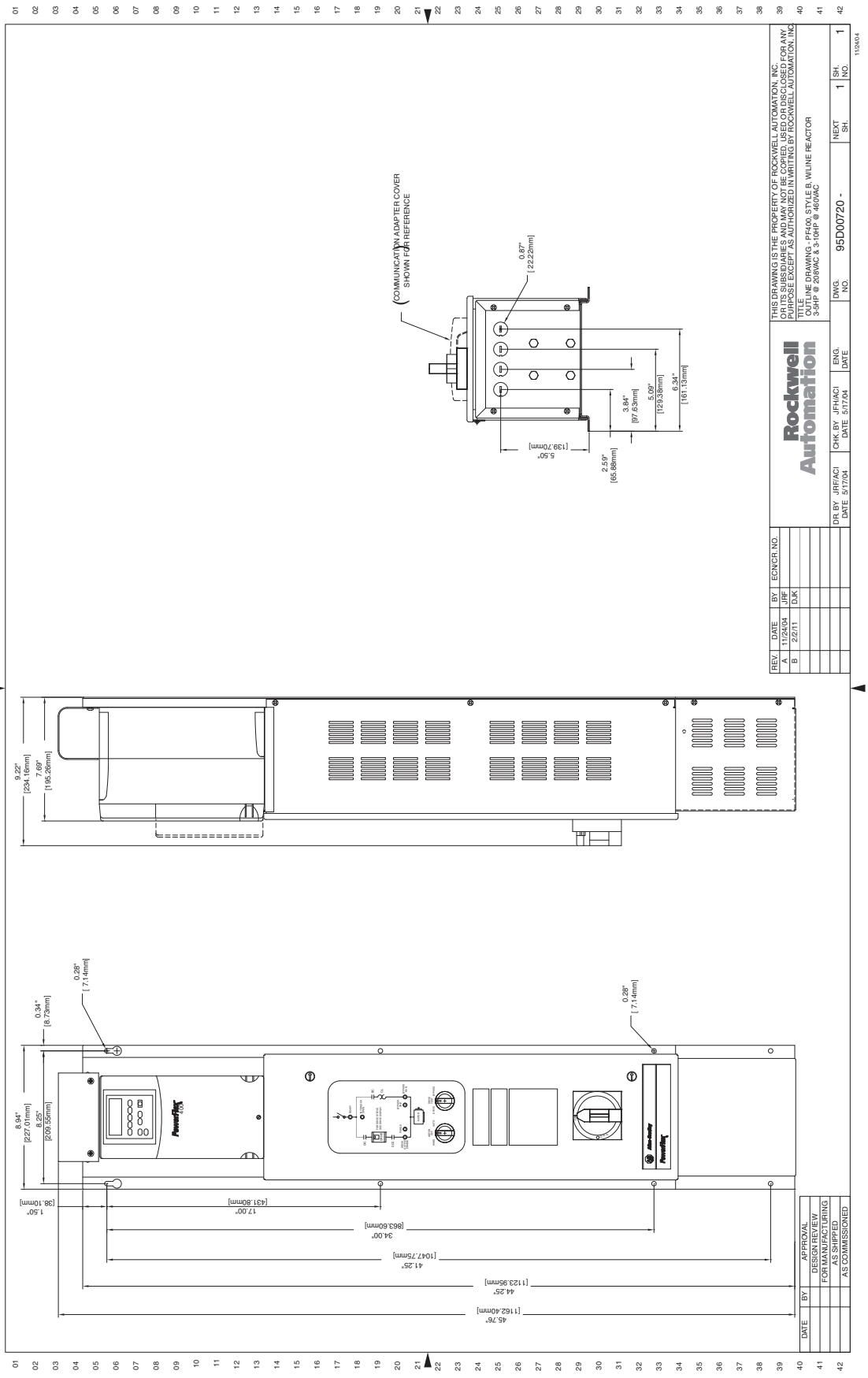


Figure 136 - 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

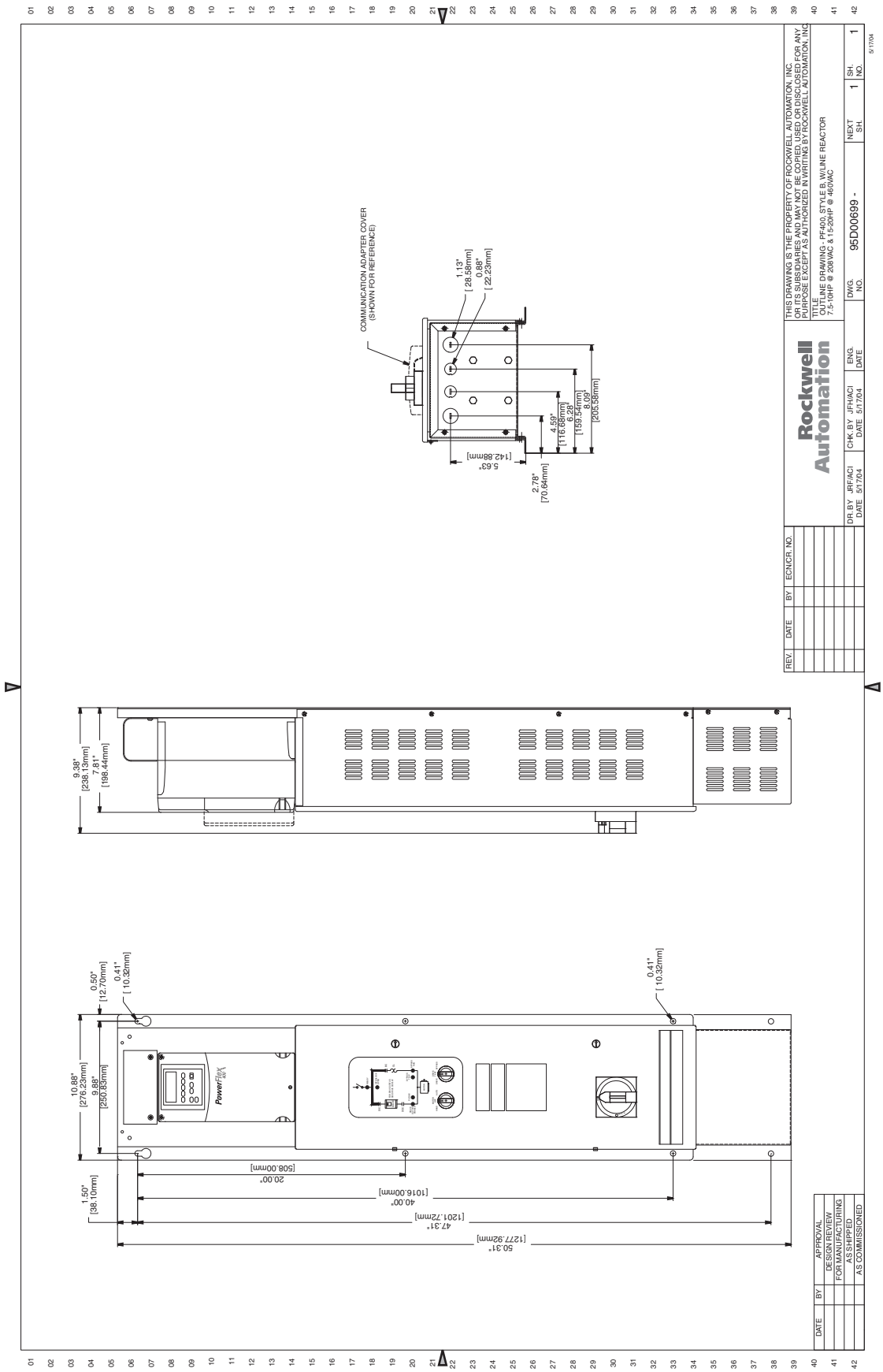


Figure 137 - 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

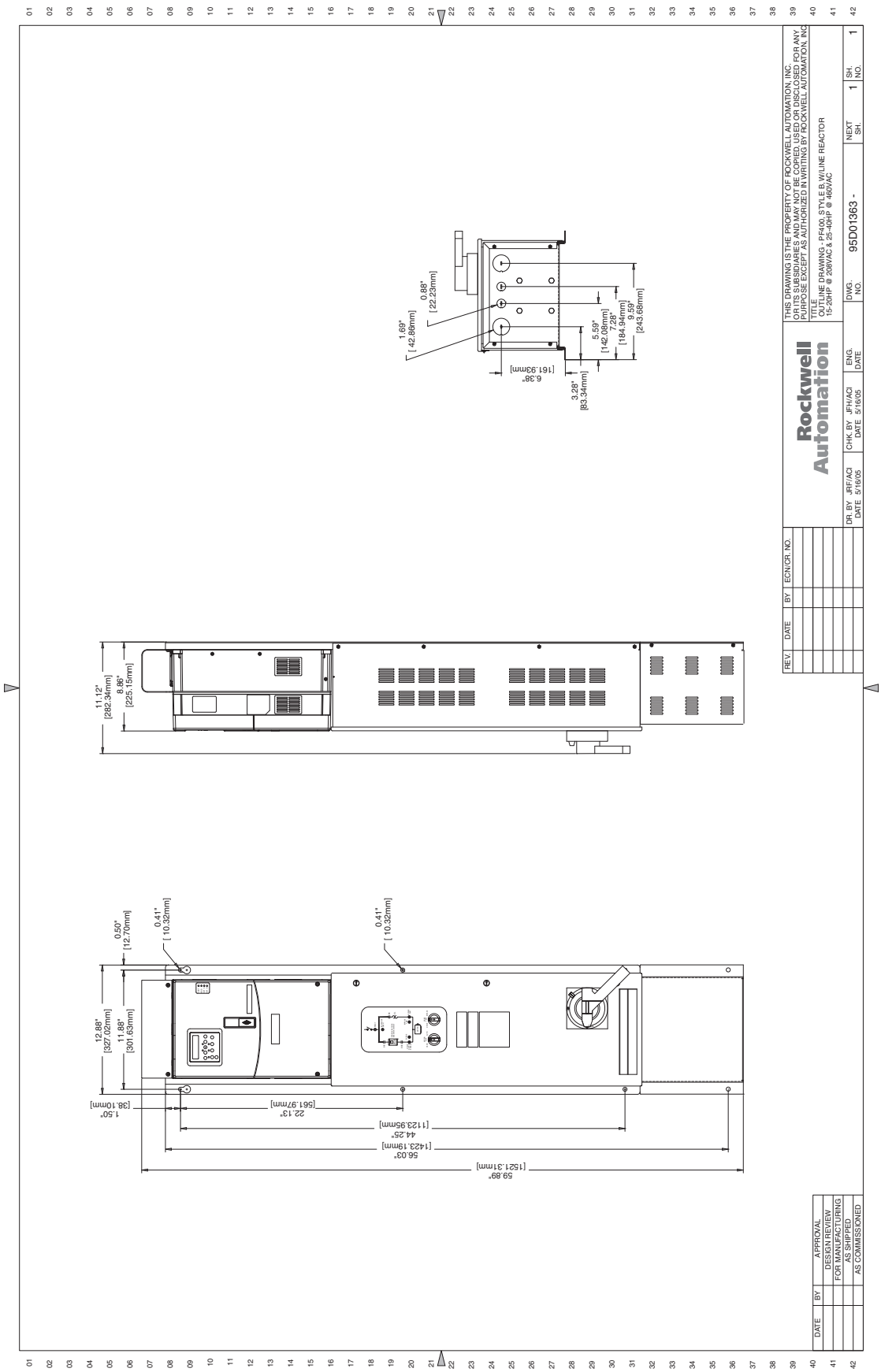


Figure 138 - 25…30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1

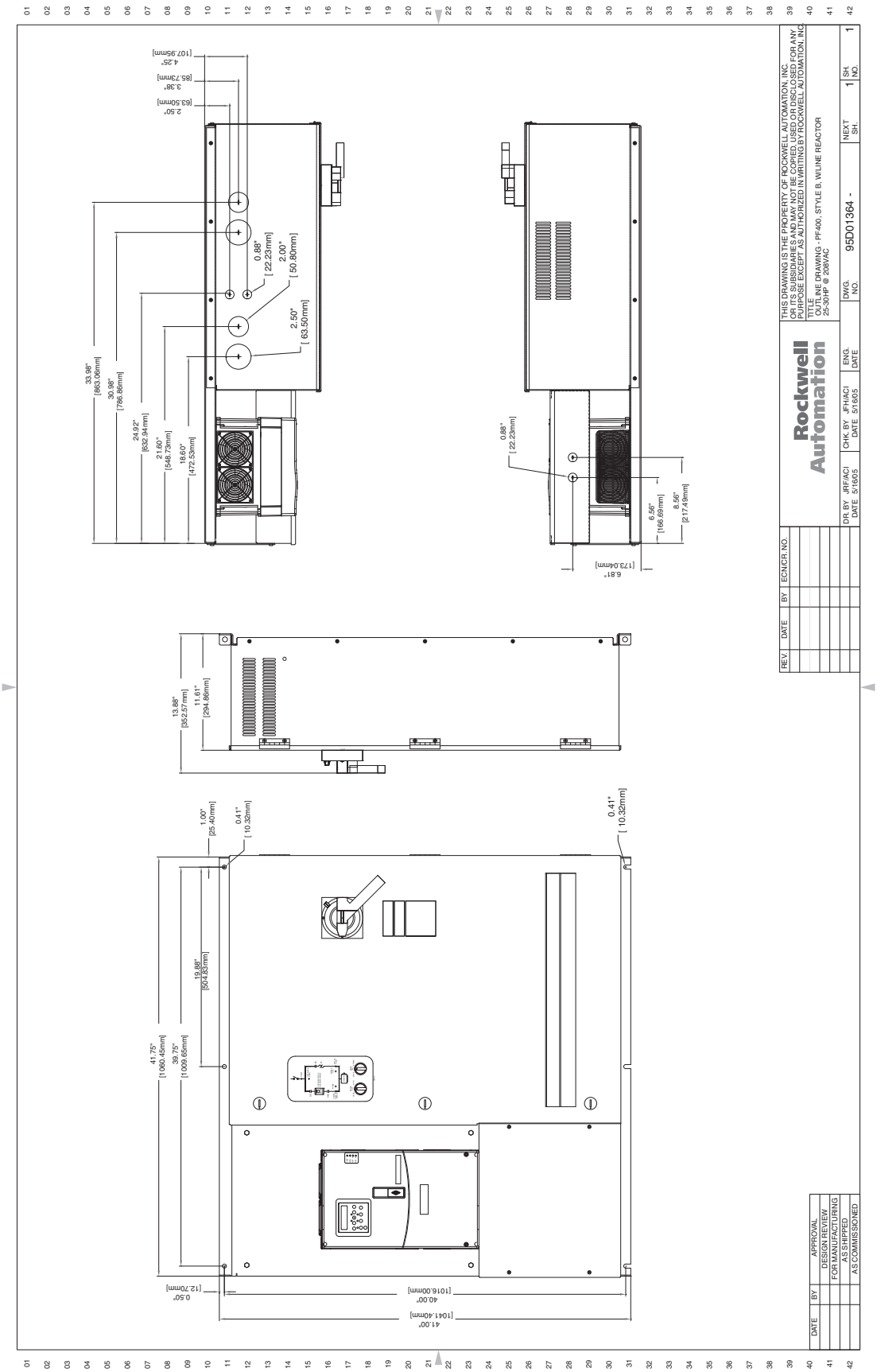


Figure 139 - 50…60 Hp, 460V AC Drives with Line Reactor - NEMAA/UL Type 1

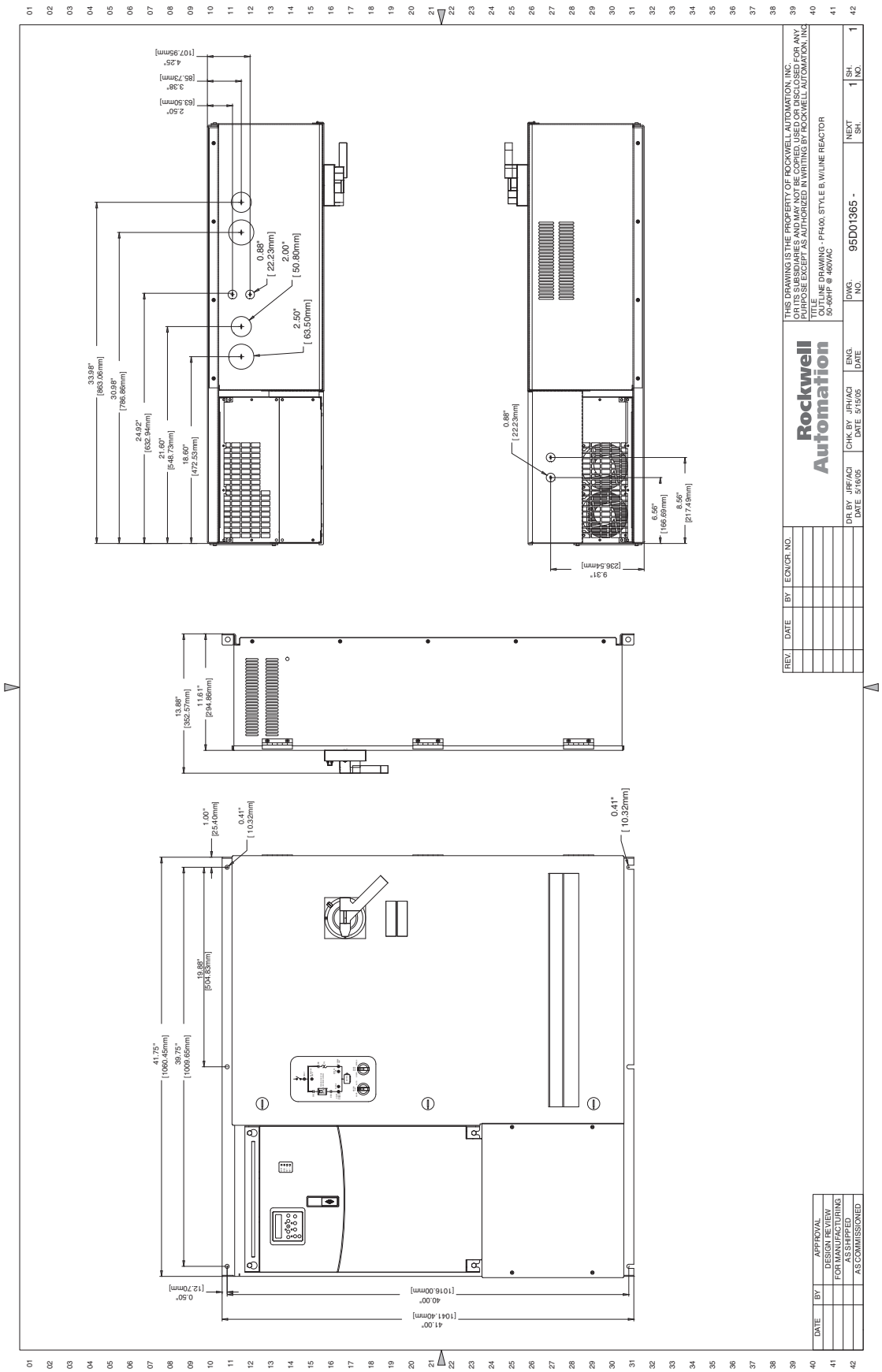


Figure 140 - 40…50 Hp, 208V AC and 75…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1

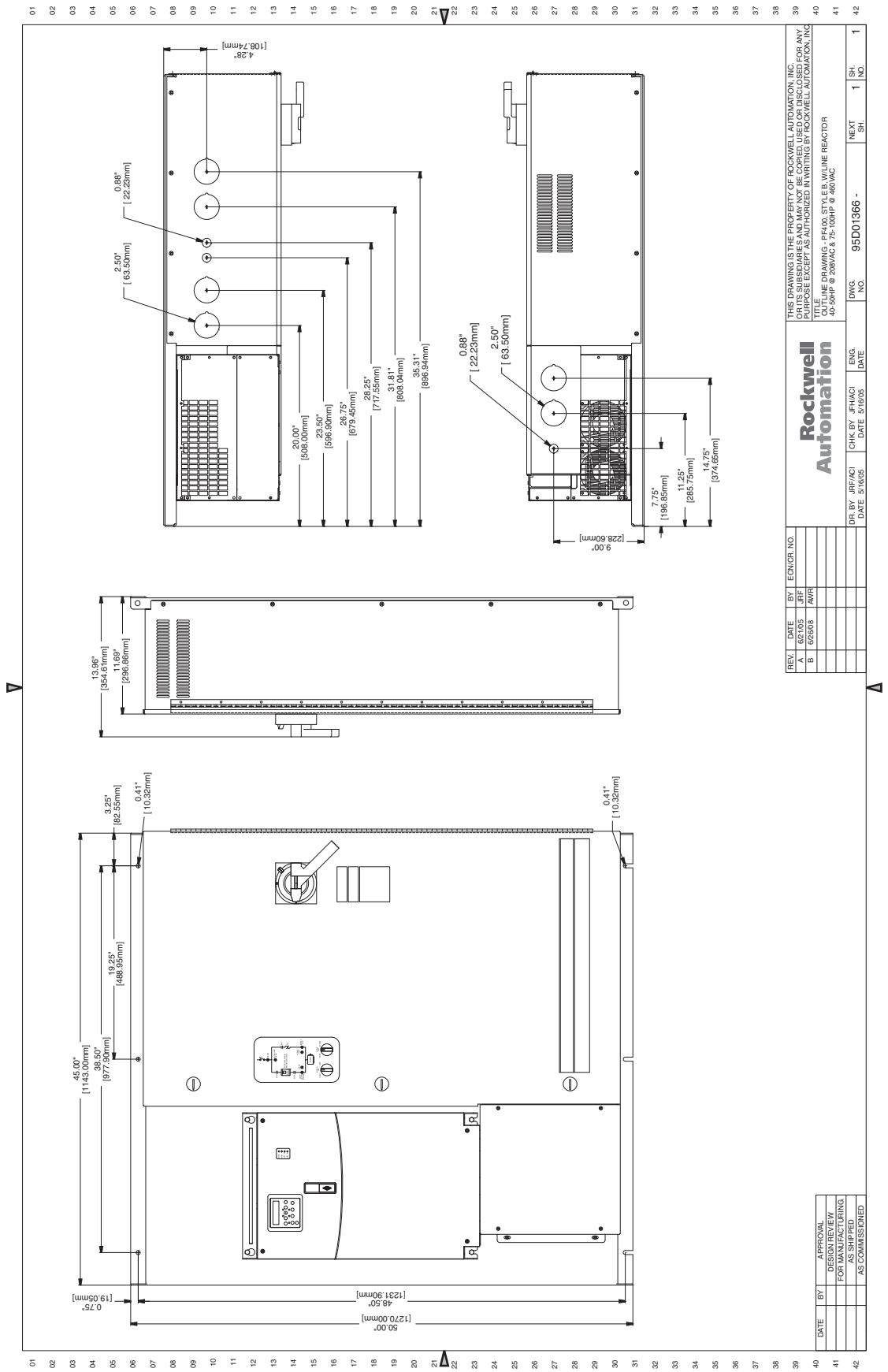


Figure 141 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 12

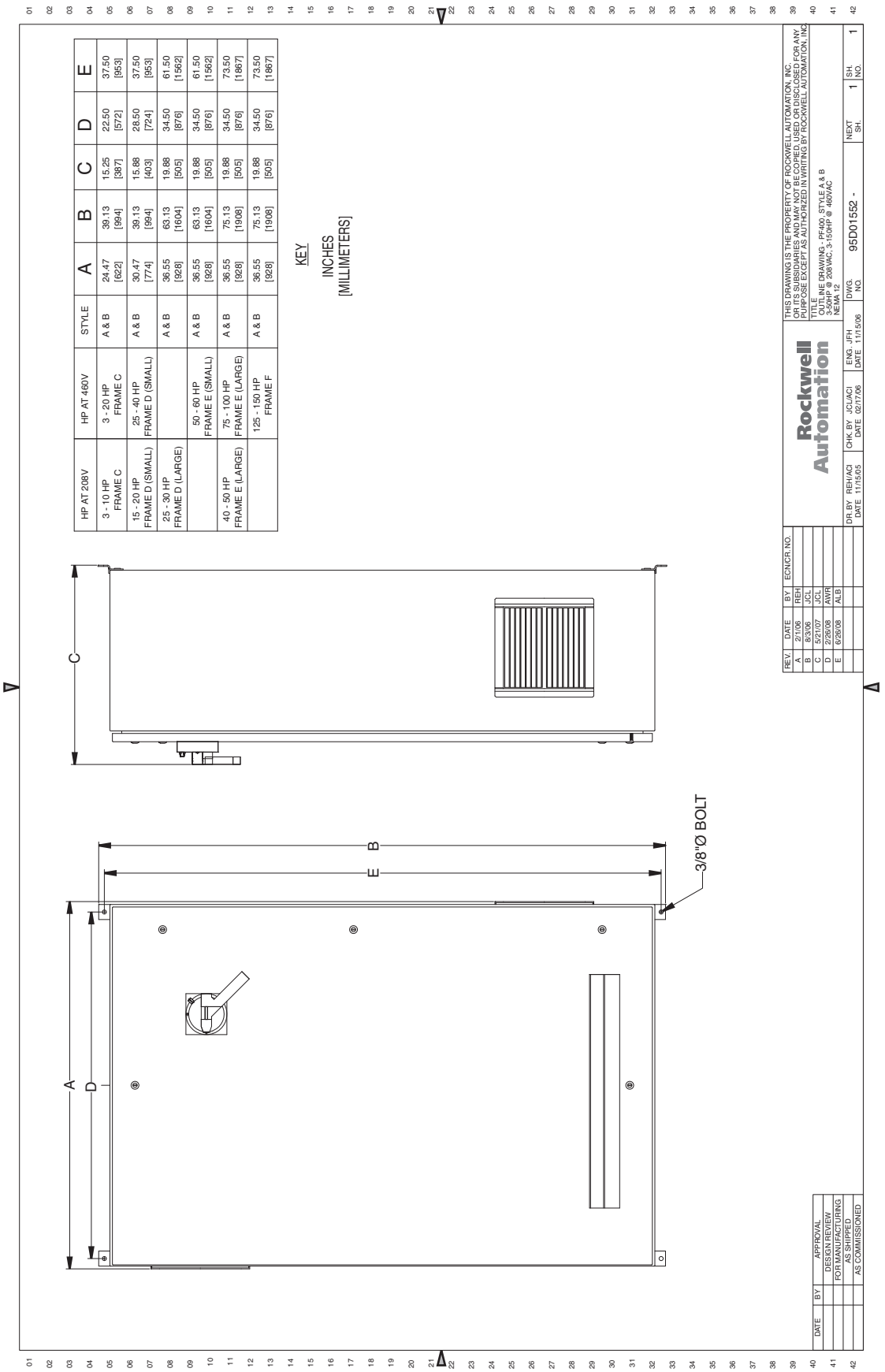


Figure 142 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 4

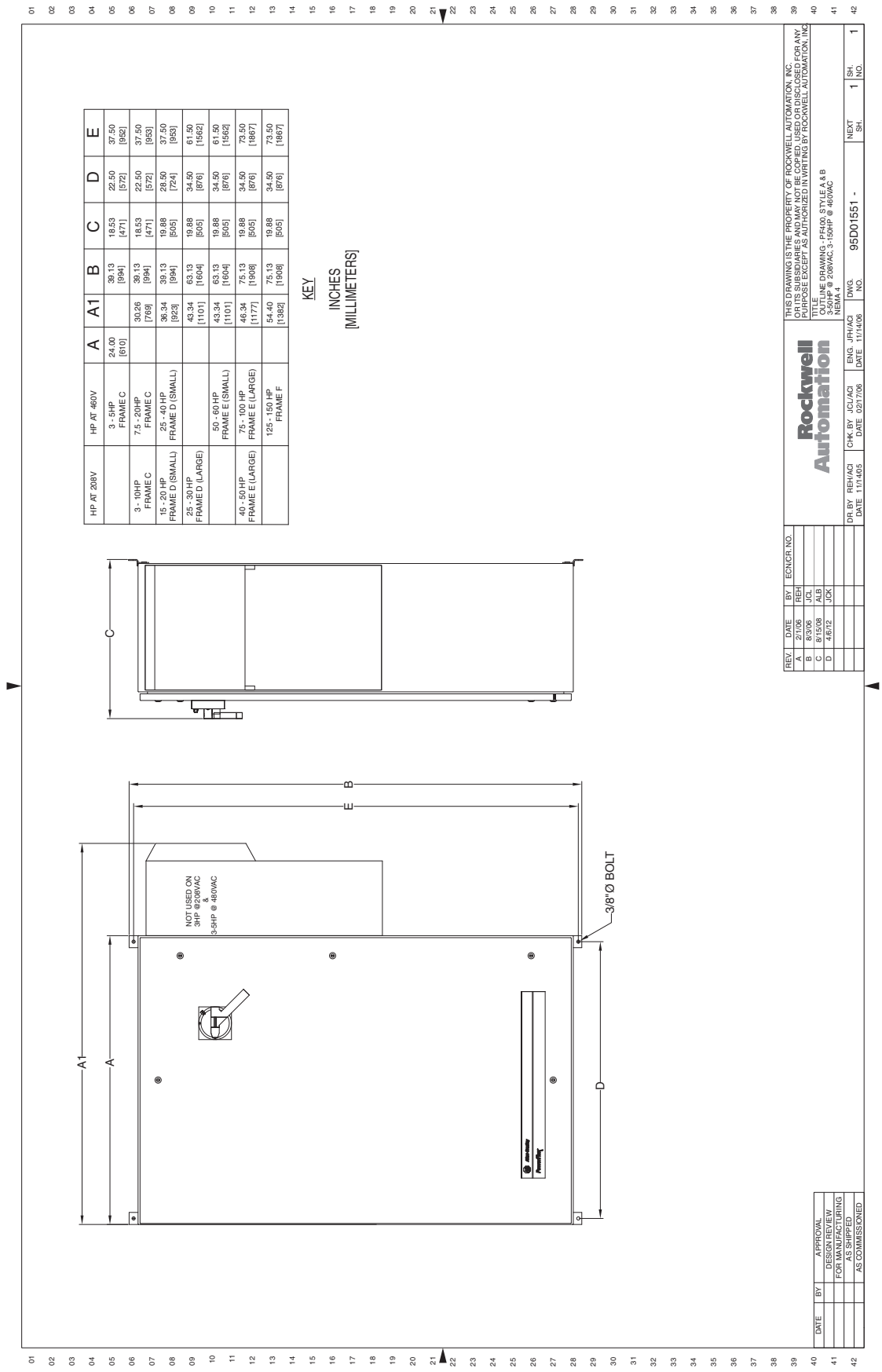
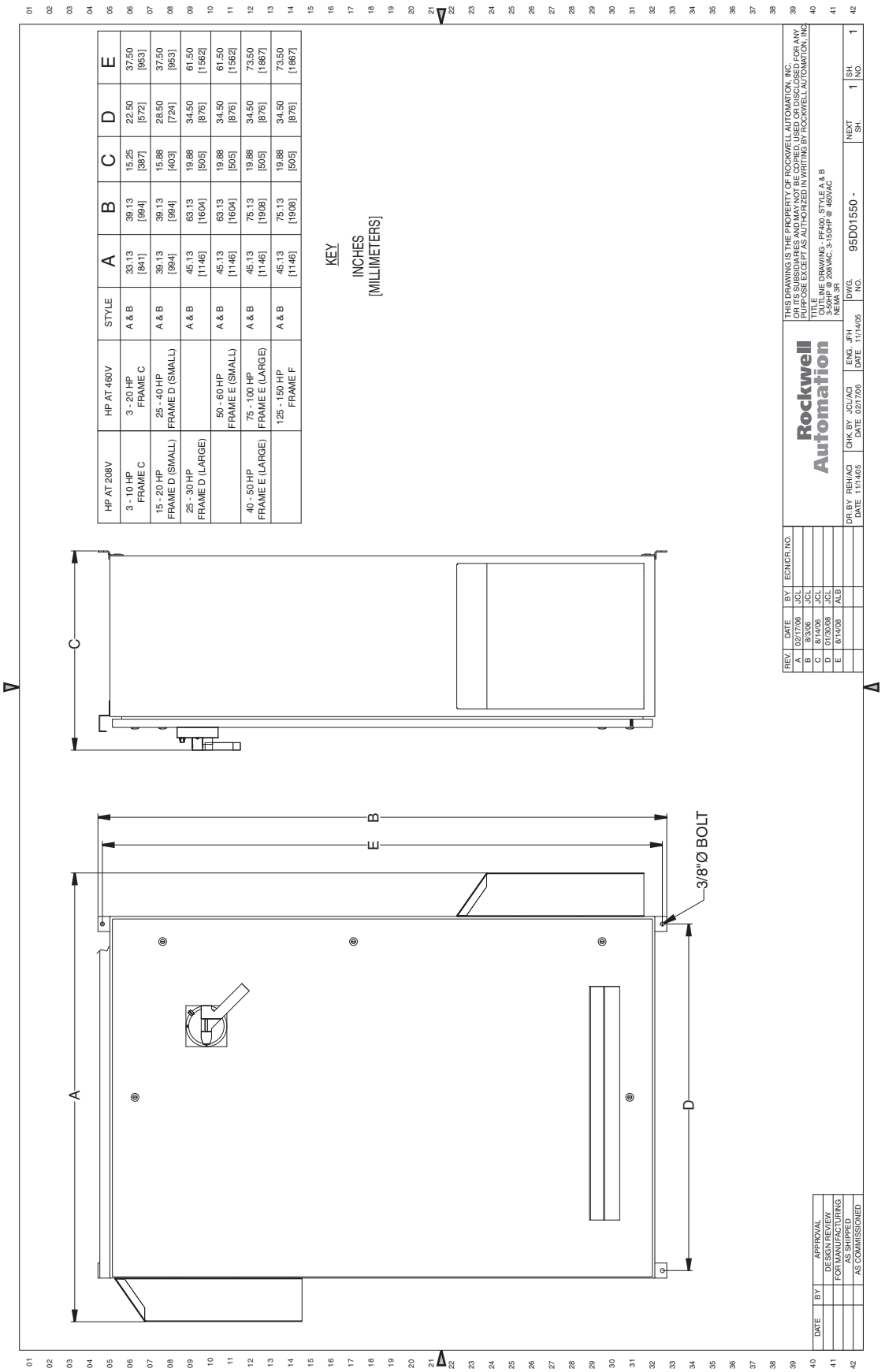


Figure 143 - 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives - NEMA/UL Type 3R



HP AT 208V	HP AT 460V	STYLE	A	B	C	D	E
3 - 10 HP FRAME C	3 - 20 HP FRAME C	A & B	33.13 [841]	39.13 [994]	15.25 [387]	22.50 [572]	37.50 [953]
15 - 20 HP FRAME D (SMALL)	25 - 40 HP FRAME D (SMALL)	A & B	39.13 [994]	39.13 [994]	15.88 [403]	28.50 [724]	37.50 [953]
25 - 30 HP FRAME D (LARGE)		A & B	45.13 [1146]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
	50 - 60 HP FRAME E (SMALL)	A & B	45.13 [1146]	63.13 [1604]	19.88 [505]	34.50 [876]	61.50 [1562]
40 - 50 HP FRAME E (LARGE)	75 - 100 HP FRAME E (LARGE)	A & B	45.13 [1146]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]
	125 - 150 HP FRAME F	A & B	45.13 [1146]	75.13 [1908]	19.88 [505]	34.50 [876]	73.50 [1867]

REV.	DATE	BY	ENGR. NO.
A	02/17/06	JCL	
B	8/3/06	JCL	
C	8/14/06	JCL	
D	01/30/08	JCL	
E	8/14/08	ALB	

DATE	BY	APPROVAL
		DESIGN REVIEW
		FOR MANUFACTURING
		AS SHIPPED
		AS COMMISSIONED

DR. BY REH/ACI DATE 1/11/405
CHK. BY JCL/ ACI DATE 12/27/06
ENG. JFH DATE 1/11/405

Rockwell Automation

TITLE
OUTLINE DRAWING - PF400, STYLE A & B
3-50HP @ 208VAC, 3-150HP @ 460VAC
NEMA 3R

DWG. NO. 95D01550 - | NEXT SH. 1 | SH. NO. 1

Mechanical Installation

This chapter provides information on mounting a PowerFlex® Drive Package for Fan and Pump Applications.

ATTENTION: The following information is merely a guide for proper installation. The Allen-Bradley® Company cannot assume responsibility for the compliance or the noncompliance to any code, national, local or otherwise for the proper installation of this drive or associated equipment. A hazard of personal injury and/or equipment damage exists if codes are ignored during installation.

Mounting Considerations

Environment

Before deciding on an installation site, verify that the PowerFlex Drive Packages can be kept clean, cool, and dry. The drives should be kept away from oil, coolants, or other airborne contaminants.

Maximum Surrounding Air Temperature

PowerFlex Drive Packages for Fan and Pump Applications are designed to operate at 0...40 °C (32...104 °F) surrounding air temperature.

Minimum Mounting Clearances

Be sure that there is adequate clearance for air circulation around the drive. For best air movement, do not mount drives directly above each other. No devices are to be mounted behind the drive. This area must be kept clear of all control and power wiring.

Figure 144 - NEMA/UL Type 1 Minimum Mounting Clearances

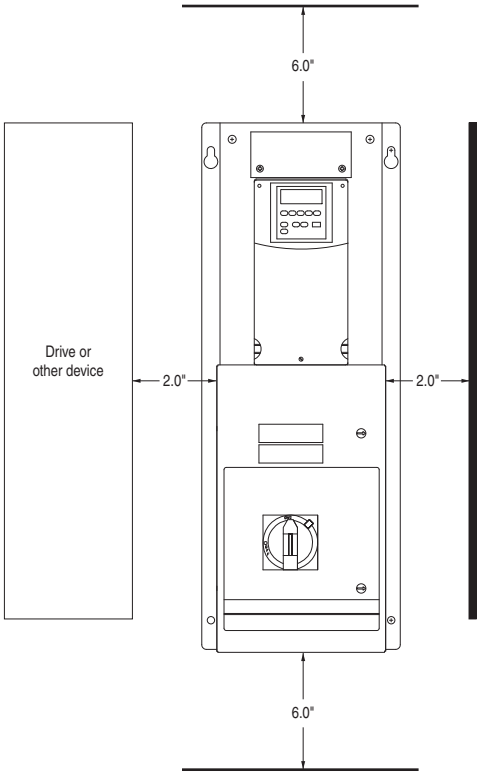


Figure 145 - NEMA/UL Type 12 Minimum Mounting Clearances

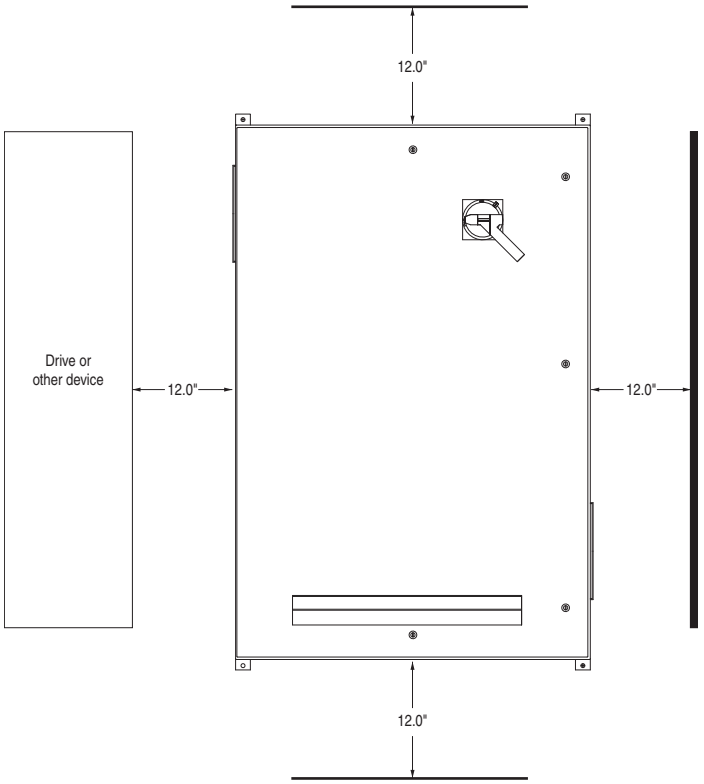


Figure 146 - NEMA/UL Type 4 Minimum Mounting Clearances

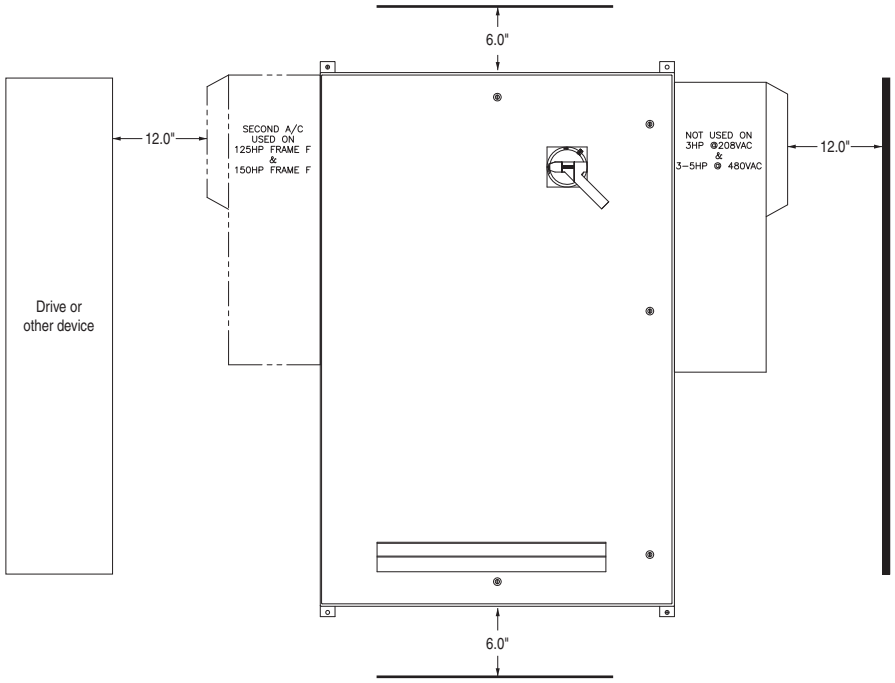
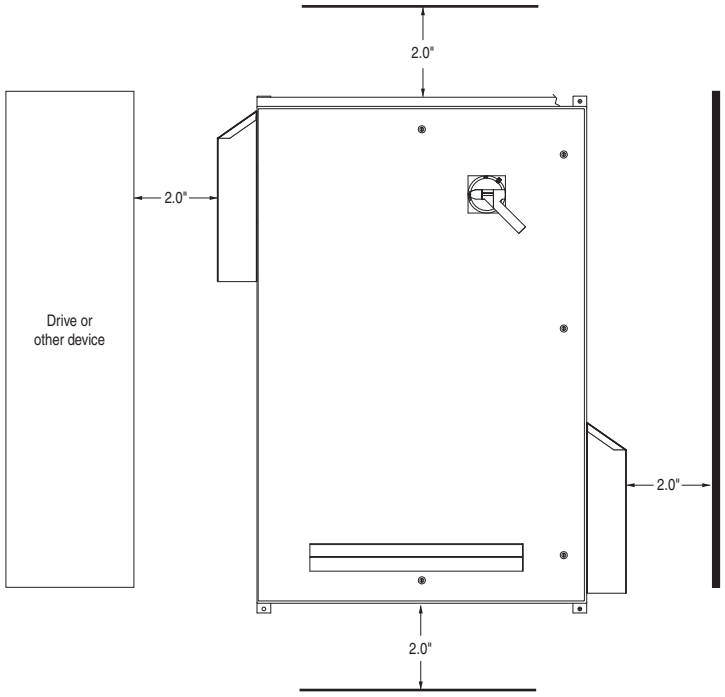


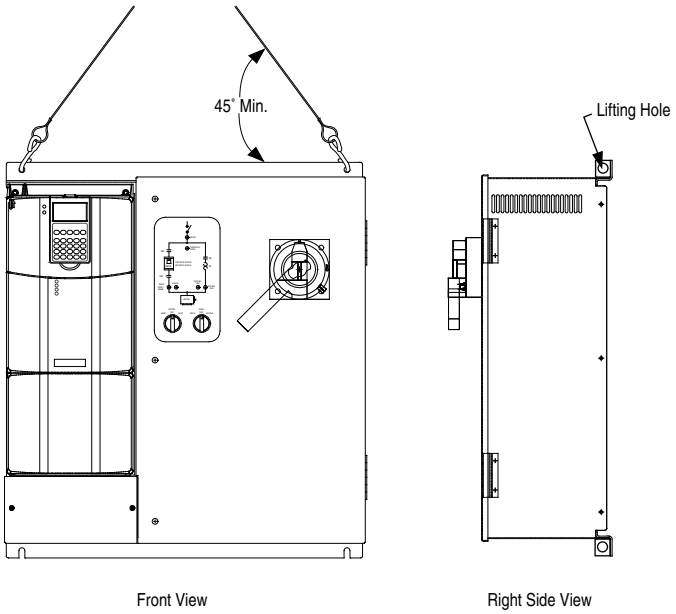
Figure 147 - NEMA/UL Type 3R Minimum Mounting Clearances



Lifting and Mounting the Drive

Care should be used to prevent damage due to dropping or jolting when moving the drive. A fork lift truck or similar means of lifting and transporting may be used. Sling in a manner that will equalize the load at the pickup points. Use a spreader bar if the angle of the sling is less than 45° relative to horizontal. Do not jolt while lifting.

Figure 148 - Lifting the Drive



Use the following procedure to lift and mount the drive.

1. Attach a sling with safety hooks or clevis clamps to the two lifting holes. Verify that the angle of the sling is not less than 45° relative to horizontal.
2. Using an overhead or portable hoist, attach a free-fall chain to the chain secured to the drive. Take up any vertical slack in the chain.
3. Using the hoist, lift the drive from the horizontal shipping pallet.
4. Position the drive.
5. Attach the drive to a vertical surface using the mounting holes provided. Use washers under the bolt heads.

Watts Loss

The following table lists watt loss data for PowerFlex Drive Packages for Fan and Pump Applications running at full load, full speed, and a factory default PWM frequency of 4 kHz.

Table 11 - Watts Loss at Full Load/Speed, 4 kHz

Voltage	kW	Hp	Total Watts
208V AC	2.2	3.0	180
	3.7	5.0	220
	5.5	7.5	308
	7.5	10	375
	11	15	498
	15	20	660
	18.5	25	744
	22	30	788
	30	40	1065
	37	50	1210
460V AC	2.2	3.0	135
	3.7	5.0	195
	5.5	7.5	209
	7.5	10	253
	11	15	336
	15	20	443
	18.5	25	499
	22	30	529
	30	40	713
	37	50	810
	45	60	1132
	55	75	1288
	75	100	1560
	90	125	1910
	110	150	2310
	132	200	3711
	160	250	4208
	200	300	4916
	250	350	6167

Weights

The following tables list weights for PowerFlex 400 Drive Packages for Fan and Pump Applications. Weights are approximate.

Table 12 - Main Input Disconnect Package (Style A/M)

Voltage	kW	Hp	Input Line Reactor	Weight kg (lbs)
208V AC	2.2	3.0	No	13.2 (29)
	3.7	5.0		13.2 (29)
	5.5	7.5		13.2 (29)
	7.5	10		13.2 (29)
	11	15		Consult Factory
	15	20		Consult Factory
	18.5	25		42.2 (93)
	22	30		42.2 (93)
	30	40		68.0 (150)
	37	50		Consult Factory
	2.2	3.0	Yes	Consult Factory
	3.7	5.0		Consult Factory
	5.5	7.5		Consult Factory
	7.5	10		Consult Factory
460V AC	2.2	3.0	No	12.7 (28)
	3.7	5.0		12.7 (28)
	5.5	7.5		12.7 (28)
	7.5	10		12.7 (28)
	11	15		12.7 (28)
	15	20		12.7 (28)
	18.5	25		26.3 (58)
	22	30		26.3 (58)
	30	40		26.3 (58)
	37	50		61.7 (136)
	45	60		61.7 (136)
	55	75		61.7 (136)
	75	100		61.7 (136)
	90	125		Consult Factory
	110	150		Consult Factory
	132	200		184.6 (407)
	160	250		186.9 (412)
	200	300		362.0 (798)
	250	350		362.0 (798)
	2.2	3.0	Yes	18.6 (41)
	3.7	5.0		18.6 (41)
	5.5	7.5		18.6 (41)
	7.5	10		18.6 (41)
	11	15		25.9 (57)
	15	20		25.9 (57)

Table 13 - 3 Contactor Full Feature Bypass with Disconnect Package (Style B/N)

Voltage	kW	Hp	Input Line Reactor	Weight kg (lbs)
208V AC	2.2	3.0	No	18.6 (41)
	3.7	5.0		18.6 (41)
	5.5	7.5		Consult Factory
	7.5	10		Consult Factory
	11	15		39.9 (88)
	15	20		39.9 (88)
	18.5	25		93.0 (205)
	22	30		93.0 (205)
	30	40		Consult Factory
	37	50		Consult Factory
	2.2	3.0	Yes	Consult Factory
	3.7	5.0		Consult Factory
	5.5	7.5		Consult Factory
	7.5	10		Consult Factory
460V AC	2.2	3.0	No	18.1 (40)
	3.7	5.0		18.1 (40)
	5.5	7.5		18.1 (40)
	7.5	10		18.1 (40)
	11	15		24.5 (54)
	15	20		24.5 (54)
	18.5	25		34.9 (77)
	22	30		34.9 (77)
	30	40		34.9 (77)
	37	50		131.5 (290)
	45	60		131.5 (290)
	55	75		131.5 (290)
	75	100		131.5 (290)
	90	125		Consult Factory
	110	150		Consult Factory
	132	200		322.1 (710)
	160	250		324.3 (715)
	200	300		392.4 (865)
	250	350		408.7 (901)
	2.2	3.0	Yes	23.6 (52)
	3.7	5.0		23.6 (52)
	5.5	7.5		23.6 (52)
	7.5	10		23.6 (52)
	11	15		34.0 (75)
	15	20		34.0 (75)

Notes:

Electrical Installation

This chapter provides information on electrical installation of a PowerFlex® Drive Package for Fan and Pump Applications.

Power Wire Size Requirements

Wire size should be determined based on the size of the conduit openings, and applicable local, national, and international codes such as NEC/CEC.

ATTENTION: National codes and standards (NEC, VDE, BSI, and so on) and local codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

Power Terminal Block Specification

Input power wiring should be sized according to applicable codes to handle the drive's continuous-rated input current. Output wiring should be sized according to applicable codes to the handle the drive's continuous-rated output current. See Table 14 for the range of power wire sizes that the terminals can accommodate.

Table 14 - Power Wire Sizes

Name	Package Style	Hp		Wire Size Range		Torque
		208V AC	480V AC	Minimum	Maximum	
Input Power L1(R), L2 (S), L3 (T)	A & B	3…5	3…10	14 AWG	8 AWG	12
		7.5…10	15…25	14 AWG	4 AWG	35
		15…20	30…50	14 AWG	2 AWG	35
		25…40	60…100	6 AWG	250 MCM	275
		50	125…200	(2) 1/0	350 MCM	275
		–	250…300	(2) 2/0	350 MCM	275
		–	350	(3) 3/0	350 MCM	275

Name	Package Style	Hp		Wire Size Range		Torque
		208V AC	480V AC	Minimum	Maximum	
Output Power T1(U), T2(V), T3(W)	A	3…10	3…20	16 AWG	8 AWG	26
		15…30	25…40	8 AWG	2 AWG	45
		–	50…60	12 AWG	2 AWG	49.5
		40…50	75…150	1/0 AWG	4/0 AWG	173
		–	200…250	(1)	(1)	260
		–	300…350	(1)	(1)	354
	B	3…7.5	3…7.5	22 AWG	8 AWG	13
		10…20	10…30	14 AWG	4 AWG	19
		25…30	40…75	12 AWG	1/0 AWG	40
		–	100…150	6 AWG	350 MCM	275
		40…50	200…300	(2) 4 AWG	350 MCM	500
		–	350	(2) 250 MCM	750 MCM	375

(1) Threaded studs provided for wire lugs.

Control and Signal Wiring

The terminal block on the Main Control board provides terminals for 24V DC power for the eight remote control inputs and outputs. The terminal block in the options cabinet provides terminals for 115V AC power for the remote control inputs and outputs. The options cabinet terminal block is factory-wired to the terminal block on the Main Control board.

Installing Input Power Wiring

ATTENTION: Protect the contents of the options cabinet from metal chips and other debris while drilling the conduit openings. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

To connect AC input power to the drive:

❑ Step 1. Wire the AC input power leads by routing them according to drive type. Power wiring sizes are listed in Table 14 on page 185.

❑ Step 2. Connect the three-phase AC input power leads (three-wire V AC) to the appropriate terminals. Connect the AC input power leads to terminals R/L1, S/L2, T/L3 on the power terminal block.

❑ Step 3. Tighten the AC input power terminals to the proper torque according to drive type as shown in Table 14 on page 185.

Installing Output Power Wiring

ATTENTION: Unused wires in conduit must be grounded at both ends to avoid a possible shock hazard that is caused by induced voltages. Also, if a drive sharing a conduit is being serviced or installed, all drives using this conduit should be disabled to eliminate the possible shock hazard from cross-coupled motor leads. Failure to observe these precautions could result in bodily injury.

ATTENTION: Do not route signal and control wiring with power wiring in the same conduit. This can cause interference with drive operation. Failure to observe these precautions could result in damage to, or destruction of, the equipment.

To connect the AC output power wiring from the drive to the motor:

❏ Step 1. Wire the three-phase AC output power motor leads by routing them according to the drive option type. You must punch openings in the option cabinet of the desired conduit size, following NEC, and all applicable local codes and standards.

Do not route more than three sets of motor leads through a conduit. This will minimize cross-talk that could reduce the effectiveness of noise reduction methods. If more than three drive/motor connections per conduit are required, shielded cable must be used. If possible, each conduit should contain only one set of motor leads.

❏ Step 2. Connect the three-phase AC output power motor leads to terminals U/T1, V/T2, W/T3 on the power terminal block in the options cabinet.

❏ Step 3. Tighten the three-phase AC output power terminals to the proper torque according to drive type as shown in Table 16 or Table 17 on page 189.

The following sections describe incoming line components and how to install them. Fuses and an input disconnect are also available as factory-installed options.

Installing an Optional Transformer or Reactor

Input isolation transformers might be needed to help eliminate:

- Damaging AC line voltage transients from reaching the drive.
- Line noise from the drive back to the incoming power source.
- Damaging currents that could develop if a point inside the drive becomes grounded.

Observe these guidelines when installing an isolation transformer:

- A power disconnecting device must be installed between the power line and the primary of the transformer.
- If the user-installed power disconnecting device is a circuit breaker, the circuit breaker trip rating must be coordinated with the inrush current (10...12 times full load current) of the transformer.
- Do not use an input isolation transformer rated more than 1000 kVA for 480V AC (500 kVA for 208V AC) with less than 5% impedance directly ahead of the drive without additional impedance between the drive and the transformer.

Table 15 shows recommended inductance and line reactor ratings.

Table 15 - AC Line Reactors

Drive (Hp)	Line Reactor Inductance (±10%)
2…3	6.5 mH
5	3.0 mH
7.5	2.5 mH
10	1.5 mH
15	1.2 mH
20	0.8 mH
25	0.8 mH
30	0.7 mH
40	0.5 mH
50...60	0.4 mH
75	0.3 mH
100	0.2 mH
125	0.15 mH
150	0.11 mH

Installing Fuses for Branch Circuit Protection

If they were not installed as a factory option, install the required branch circuit protection fuses according to the applicable local, national, and international codes (such as NEC/CEC). The fuses must be installed in the line before the drive input terminals.

ATTENTION: Most codes require that upstream branch protection be provided to protect input power wiring. Failure to observe this precaution could result in severe bodily injury or loss of life.

Installing the Required External/Separate Input Disconnect

An input disconnect must be installed in the line before the drive input terminals in accordance with local, national, and international codes, such as NEC/CEC. If an input disconnect is not installed as a factory option, the disconnect should be sized according to the inrush current as well as any additional loads the disconnect might supply. The trip rating for the inrush current (10...12 times full load current) should be coordinated with that of the input isolation transformer, if used.

Installing Input/Output Power Wiring

Table 16 - Style A Terminals

208V AC Hp	480V AC Hp	Maximum Tightening Torque
Input Power		
3…5	3…10	12 lb•in
7.5…10	15…25	35 lb•in
15…20	30…50	35 lb•in
25…50	60…350	275 lb•in
Output Power		
3…10	3…20	26 lb•in
15…30	25…40	45 lb•in
–	50…60	49.5 lb•in
40…50	75…150	173 lb•in
–	200…250	260 lb•in
–	300…350	354 lb•in

Table 17 - Style B Terminals

208V AC Hp	480V AC Hp	Maximum Tightening Torque
Input Power		
3…5	3…10	12 lb•in
7.5…10	15…25	35 lb•in
15…20	30…50	35 lb•in
25…50	60…350	275 lb•in
Output Power		
3…7.5	3…7.5	13 lb•in
10…20	10…30	19 lb•in
25…30	40…75	40 lb•in
–	100…150	275 lb•in
40…50	200…300	500 lb•in
–	350	375 lb•in

Notes:

Supplemental Information

Specifications

Category	Specification	
Environment	Altitude:	1000 m (3300 ft.) max. without derating
	Surrounding Air Temperature without Derating:	0° C to 40° C (32° F to 104° F)
	Storage Temperature (all const.):	-40° C to 70° C (-40° F to 158° F)
	Relative Humidity:	5% to 95% noncondensing
	Shock:	15 G peak for 11 ms duration (+/- 1.0 ms)
	Vibration:	0.152 mm (0.006 in.) displacement, 1 G peak, 5.5 Hz
All Others	See the PowerFlex® 400 User Manual, publication 22C-UM001	

Notes:

Replacement Parts

Common Parts

Components are manufactured by Allen-Bradley except as noted.

Table 1 - Common Parts

Description	Designation	Voltage	Hp	Part Number
Drive Module	DM1	208V AC	3.0	22C-B012N103
			5.0	22C-B017N103
			7.5	22C-B024N103
			10	22C-B033N103
			15	22C-B049A103
			20	22C-B065A103
			25	22C-B075A103
			30	22C-B090A103
			40	22C-B120A103
			50	22C-B145A103
		460V AC	3.0	22C-D6P0N103
			5.0	22C-D010N103
			7.5	22C-D012N103
			10	22C-D017N103
			15	22C-D022N103
			20	22C-D030N103
			25	22C-D038A103
			30	22C-D045A103
			40	22C-D060A103
			50	22C-D072A103
			60	22C-D088A103
			75	22C-D105A103
			100	22C-D142A103
			125	22C-D170A103
			150	22C-D208A103
			200	22C-D260A103
			250	22C-D310A103
			300	22C-D370A103
			350	22C-D460A103

Table 1 - Common Parts (continued)

Description	Designation	Voltage	Hp	Part Number
Comm Cards	C	All	All	22-COMM-C
	D			22-COMM-D
	E			22-COMM-E
	P			22-COMM-P
	B			22-COMM-B
	L			22-COMM-L
Comm Cover		208V AC	3.0…10	22C-CCC
		460V AC	3.0…20	22C-CCC
Line Reactors	LR	208V AC	3	1321-3R12-A
			5	1321-3R18-A
			7.5	1321-3R25-A
			10	1321-3R35-A
			15	1321-3R45-A
			20	1321-3R55-A
			25	1321-3R80-A
			30	1321-3R100-A
			40…50	1321-3R130-A
		460V AC	3	1321-3R8-C
			5	1321-3R8-B
			7.5	1321-3R12-B
			10	1321-3R18-B
			15	1321-3R25-B
			20…25	1321-3R35-B
			30	1321-3R45-B
			40	1321-3R55-B
			50…60	1321-3R80-B
			75	1321-3R100-B
			100	1321-3R130-B
			125	1321-3R160-B
			150	1321-3R200-B

Disconnect Parts

Components are manufactured by Allen-Bradley except as noted.

Table 2 - Disconnect Parts for Style A/B Fused Disconnect Packages

Description	Designation	Voltage	Hp	Part Number
Disconnect Switch	DS	208V AC	3.0…5.0	194R-J30-1753
			7.5…10	194R-J60-1753
			15…20	194R-NJ100P3
			25…40	194R-NJ200P3
			50	194R-NJ400P3
		460V AC	3.0…10	194R-J30-1753
			15…25	194R-J60-1753
			30…50	194R-NJ100P3
			60…100	194R-NJ200P3
			125…200	194R-NJ400P3
			250	HLD3500 (1)
			300	HLD3600 (1)
			350	HMDL3700 (1)
Operator Handle (NEMA/UL Type 1, 12, 3R, 4)		208V AC	3.0…10	194R-PB
			15…50	194R-HM4
		460V AC	3.0…25	194R-PB
			30…200	194R-HM4

Table 2 - Disconnect Parts for Style A/B Fused Disconnect Packages (continued)

Description	Designation	Voltage	Hp	Part Number
Operator Shaft		208V AC	3.0…10	194R-R2
			15…50	194R-R4
		460V AC	3.0…25	194R-R2
			30…100	194R-R4
			125…200	194R-R6
Main Fuses	FU1…FU3	208V AC	3.0	AJT-20 (2)
			5.0	AJT-20 (2)
			7.5	AJT-35 (2)
			10	AJT-40 (2)
			15	AJT-80 (2)
			20	AJT-100 (2)
			25	AJT-125 (2)
			30	AJT-150 (2)
			40	AJT-200 (2)
			50	AJT-250 (2)
		460V AC	3.0	AJT-10 (2)
			5.0	AJT-15 (2)
			7.5…10	AJT-20 (2)
			15…20	AJT-35 (2)
			25	AJT-60 (2)
			30	AJT-70 (2)
			40	AJT-80 (2)
			50	AJT-100 (2)
			60	AJT-150 (2)
			75	AJT-175 (2)
			100	AJT-200 (2)
			125	AJT-250 (2)
			150	AJT-350 (2)
			200	AJT-400 (2)

(1) Manufactured by Cutler Hammer.

(2) Manufactured by Gould-Shawmut.

Table 3 - Disconnect Parts for Style M/N Circuit Breaker Packages

Description	Designation	Voltage	Hp	Part Number
Circuit Breakers	CB1	208V AC	3	EGS3015FFG (1)
			5	EGS3030FFG (1)
			7.5	EGS3040FFG (1)
			10	EGS3050FFG (1)
			15	EGS3080FFG (1)
			20	EGS3100FFG (1)
			25	EGS3125FFG (1)
			30	JGS3150FAG (1)
			40	JGS3200FAG (1)
			50	JGH3225FAG (1)
		460V AC	3.0…5	EGH3015FFG (1)
			7.5	EGH3020FFG (1)
			10	EGH3025FFG (1)
			15	EGH3035FFG (1)
			20	EGH3040FFG (1)
			25	EGH3050FFG (1)
			30	EGH3060FFG (1)
			40	EGH3080FFG (1)
			50	EGH3100FFG (1)
			60	EGH3125FFG (1)
			75	JGH3150FAG (1)
			100	JGH3200FAG (1)
			125	JGH3250FAG (1)
			150	HKD3300 (1)
			200	HKD3350 (1)
			250	HLD3500 (1)
			300	HLD3600 (1)
			350	HMDL3700 (1)
Operator Handle (NEMA/UL Type 1/12) for Enclosure Options A and H		208V AC	3.0…25	EHMVD24B
			30…50	FJHMVD24B
		460V AC	3.0…60	EHMVD24B
			75…125	FJHMVD24B
			150…200	HM3R24
			250…350	HM4R24
Operator Handle (NEMA/UL Type 3R/4) for Enclosure Options X and E		208V AC	3.0…25	EGHMVD24BX
			30…50	JGHMVD24BX
		460V AC	3.0…60	EGHMVD24BX
			75…125	JGHMVD24BX
			150…200	HM3R24X
			250…350	HM4R24X
Terminal Lugs		208V AC	3.0…25	-
			30…50	TA250FJ
		460V AC	3.0…60	-
			75…125	TA250FJ
			150…200	TA350K
			250…300	TA602LDM
			350	TA800MA2

(1) Manufactured by Cutler Hammer.

Bypass Parts

Components are manufactured by Allen-Bradley except as noted.

Table 4 - Bypass Parts for Style B/N Full Feature Bypass Packages

Description	Designation	Voltage	Hp	Part Number
Bypass Contactor	BC	208V AC	3.0…5.0	100-C23D10
			7.5…10	100-C37D00
			15	100-C60D00
			20	100-C72D00
			25	100-C85D00
			30…40	100-D115ED11
			50	100-D180ED11
		460V AC	3.0…10	100-C16D10
			15…20	100-C37D10
			25…30	100-C43D00
			40…50	100-C72D00
			60	100-C85D00
			75	100-D115ED11
			100	100-D140ED11
			125	100-D180ED11
			150	100-D210ED11
			200	100-D250ED11
			250	100-D300ED11
			300…350	100-D420ED11
Input Contactor	DIC	208V AC	3.0…5.0	100-C16D10
			7.5…10	100-C23D10
			15	100-C60D10
			20	100-C72D00
			25…30	100-C85D00
			40	100-D115ED11
			50	100-D140ED11
		460V AC	3.0…10	100-C16D10
			15…20	100-C23D10
			25…30	100-C43D00
			40…50	100-C72D00
			60	100-C85D00
			75…100	100-D115ED11
			125	100-D140ED11
			150…200	100-D210ED11
			250	100-D300ED11
			300…350	100-D420ED11
Output Contactor	DOC	208V AC	3.0…7.5	100-C16D10
			10	100-C23D10
			15	100-C37D00
			20	100-C43D00
			25…30	100-C72D00
			40…50	100-D115ED11
		460V AC	3.0…20	100-C16D10
			25…30	100-C37D00
			40	100-C43D00
			50…60	100-C72D00
			75	100-C85D00
			100…125	100-D115ED11
			150	100-D140ED11
			200	100-D210ED11
			250	100-D300ED11
			300…350	100-D420ED11

Table 4 - Bypass Parts for Style B/N Full Feature Bypass Packages (continued)

Description	Designation	Voltage	Hp	Part Number
Contactor Suppressors		230V AC	3.0…30	100-FSV136
		460V AC	3.0…75	100-FSV136
Overload Relay	OL	208V AC	3.0	193-EEDB
			5.0	193-EEEB
			7.5	193-EEED
			10	193-EEED
			15…25	193-EEGE
			30…40	193-EEVF
			50	193-EEJF
		460V AC	3.0	193-EECB
			5.0…7.5	193-EEDB
			10	193-EEEB
			15	193-EEED
			20…30	193-EEFD
			40…60	193-EEGE
			75	193-EEVF
			100…125	193-EEJF
			150	193-EEJG
			200…350	193-EELG
Bypass Control Panel	CP1	208V AC	3.0…50	SK-C1-BCP1
		460V AC	3.0…350	SK-C1-BCP1
Power Terminal Blocks	T1…T3	208V AC	3.0…7.5	1492-W10
			10…20	1492-W16S
			25…30	1492-J35
			40	67013 (1)
			50	67003
		460V AC	3.0…15	1492-W10
			20…30	1492-W16S
			40…75	1492-J35
			100	67013 (1)
			125…150	67003 (1)
			200…300	69313 (1)
			350	PDB-26-750-1 (2)
Ground Terminal Block	MG	208V AC	3.0…7.5	1492-W10
			10…20	1492-W16S
			25…50	1492-J35
		460V AC	3.0…15	1492-W10
			20…30	1492-W16S
			40…100	1492-J35
			125…350	1492-J70
Control Terminal Blocks	T31…T40	208V AC	3.0…50	1492-W4
		460V AC	3.0…350	1492-W4

(1) Manufactured by Gould-Shawmut.

(2) Manufactured by Ilsco.

Enclosure Parts

Table 5 - Enclosure Parts for NEMA/UL Type 1 (Style B only)

Description	Designation	Voltage	Hp	Part Number
Control Transformer	T1	208V AC	3.0…10	TB-69300 (1)
			15…30	TB-69301 (1)
			40…50	TB-69302 (1)
		460V AC	3.0…20	TB-69300 (1)
			25…60	TB-69301 (1)
			75…250	TB-69302 (1)
			300…350	TA-2-81215 (1)
Control Transformer Fuse Holder		208V AC	3.0…30	PL-112700
			40…50	PL-112701
		460V AC	3.0…60	PL-112700
			75…250	PL-112701
			300…350	PL-112703
Control Transformer Fuses	FU4…FU5	208V AC	3.0…10	ATQR-1 (2)
			15…30	ATQR-2 (2)
			40…50	ATQR-3 (2)
		480V AC	3.0…60	ATQR-1 (2)
			75…250	ATQR-2 (2)
			300…350	ATQR-3.5 (2)

(1) Manufactured by Acme Electric.

(2) Manufactured by Gould-Shawmut.

Table 6 - Enclosure Parts for NEMA/UL Type 12

Description	Designation	Voltage	Hp	Part Number
Control Transformer	T1	208V AC	3.0…10	TB-69301 (1)
			15…30	TB-69302 (1)
			40…50	TB-69302 (Style A) (1)
			40…50	TB-69303 (Style B) (1)
		460V AC	3.0…15	TA-2-69301 (1)
			20…60	TB-69302 (1)
			75…125	TB-69303 (1)
			150	TB-69305 (1)
Control Transformer Fuse Holder		208V AC	3.0…10	PL-112700 (1)
			15…50	PL-112701 (1)
		460V AC	3.0…15	PL-112700 (1)
			20…60	PL-112701 (1)
			75…125	PL-112702 (1)
			150	PL-112704 (1)
Control Transformer Primary Fuses	FU4…FU5	208V AC	3.0…10	ATQR-1.5
			15…30	ATQR-2
			40…50	ATQR-2 (Style A)
			40…50	ATQR-3 (Style B)
		460V AC	3.0…60	ATQR-1
			75…125	ATQR-1.5
			150	ATQR-3.5
Control Circuit Fan Fuse Holder		208V AC	3.0…50	BM6031PQ
		460V AC	3.0…150	BM6031PQ

Table 6 - Enclosure Parts for NEMA/UL Type 12 (continued)

Description	Designation	Voltage	Hp	Part Number
Control Circuit Fan Fuse	FU6	208V AC	3.0…10	FNM-1
			15…30	FNM-1.4
			40…50	FNM-1.4 (Style A)
			40…50	FNM-2 (Style B)
		460V AC	3.0…60	FNM-1
			75…125	FNM-3.2
			150	FNM-5
Fan and Filter	–	208V AC	3.0…7.5	PF42500 (2)
			10…20	PF43000 (2)
			25…50	PF65000 (2)
		460V AC	3.0…15	PF42500 (2)
			20…40	PF43000 (2)
			50, 60 and 125	PF65000 (2)
			75	PF66000 (2)
			100 and 150	PF67000 (2)
Exhaust Filter w/Grille		208V AC	3.0…20	PFA4000 (2)
			25…50	PFA6000 (2)
		460V AC	3.0…40	PFA4000 (2)
			50…150	PFA6000 (2)
Filter Media		208V AC	3.0…20	18611600036 (2)
			25…50	18611600037 (2)
		460V AC	3.0…40	18611600036 (2)
			50…150	18611600037 (2)

(1) Manufactured by Acme Electric.
(2) Manufactured by Pfannenberg Inc.

Table 7 - Enclosure Parts for NEMA/UL Type 3R

Description	Designation	Voltage	Hp	Part Number
Control Transformer	T1	208V AC	3.0…30	TB-69302 (1)
			45…50	TB-69303 (1)
		460V AC	3.0…40	TB-69302 (1)
			50…150	TB-69303 (1)
Control Transformer Fuse Holder		208V AC	3.0…30	PL-112701 (1)
			40…50	PL-112702 (1)
		460V AC	3.0…40	PL-112701 (1)
			50…150	PL-112702 (1)
Control Transformer Primary Fuses	FU4…FU5	208V AC	3.0…30	ATQR-2
			40…50	ATQR-3.5
		460V AC	3.0…40	ATQR-1
			50…150	ATQR-1.5
Control Circuit Fan Fuse Holder		208V AC	3.0…50	BM6031PQ
		460V AC	3.0…5.0	No Fan
			7.5…150	BM6031PQ
Control Circuit Fan Fuse	FU6	208V AC	3.0…50	FNM-1
		460V AC	3.0…100	FNM-1
			125…150	FNM-2

Table 7 - Enclosure Parts for NEMA/UL Type 3R (continued)

Description	Designation	Voltage	Hp	Part Number
Fan and Filter		208V AC	3.0…10	SCE-FA44 (2)
			15…30	SCE-FA66 (2)
			40…50	SCE-FA1010 (2)
		460V AC	3.0…5.0	No Fan
			7.5…20	SCE-FA44 (2)
			25…40	SCE-FA66 (2)
			50…150	SCE-FA1010 (2)
Exhaust Filter w/Grille		208V AC	3.0…10	SCE-FGA44 (2)
			15…30	SCE-FGA66 (2)
			40…50	SCE-FGA1010 (2)
		460V AC	3.0…5.0	No Filter
			7.5…20	SCE-FGA44 (2)
			25…40	SCE-FGA66 (2)
			50…150	SCE-FGA1010 (2)
Filter Media		208V AC	3.0…10	SCE-RF44 (2)
			15…20	SCE-RF66 (2)
			25…50	SCE-RF1010 (2)
		460V AC	3.0…5.0	No Filter
			7.5…20	SCE-RF44 (2)
			25…40	SCE-RF66 (2)
			50…150	SCE-RF1010 (2)
Control Circuit Heater Fuse Holder		208V AC	3.0…50	BM6031PQ
		460V AC	3.0…150	BM6031PQ
Control Circuit Heater Fuse	FU7	208V AC	3.0…20	FNM-2
			25…50	FNM-3.2
		460V AC	3.0…40	FNM-2
			50…150	FNM-3.2
Heater		208V AC	3.0…20	D-AH1001A (3)
			25…50	D-AH2001A (3)
		460V AC	3.0…40	D-AH1001A (3)
			50…150	D-AH2001A (3)

(1) Manufactured by Acme Electric.
(2) Manufactured by Saginaw Control and Engineering
(3) Manufactured by Hoffman Enclosures Inc.

Table 8 - Enclosure Parts for NEMA/UL Type 4

Description	Designation	Voltage	Hp	Part Number
Control Transformer	T1	208V AC	3.0…20	TA-2-54525 (1)
			25…30	TA-2-81202 (1)
			40…50	TA-2-81203 (1)
		460V AC	3.0…5.0	TA-2-69302 (1)
			7.5…40	TA-2-54525 (1)
			50…60	TA-2-81202 (1)
			75…100	TA-2-81203 (1)
			125…150	TA-2-69303 (1)
Control Transformer Fuse Holder		208V AC	3.0…30	PL-112706 (1)
			40…50	PL-112707 (1)
		460V AC	3.0…5.0	PL-112701 (1)
			7.5…60	PL-112706 (1)
			75…100	PL-112707 (1)
			125…150	PL-112702 (1)
Control Transformer Primary Fuses	FU4…FU5	208V AC	3.0…20	ATQR-12
			25…30	ATQR-15
			40…50	ATQR-20
		460V AC	3.0…5.0	ATQR-1
			7.5…40	ATQR-5
			50…60	ATQR-7.5
			75…100	FRS-R-12
			100…150	ATQR-1.5
Air Conditioner		208V AC	3.0…10	IQ1800VS-126 (2)
			15…20	IQ3000VS-126 (2)
			25…30	IQ5000V16-126 (2)
			40…50	IQ8000V16-126 (2)
		460V AC	3.0…5.0	No Air Conditioner
			7.5…20	IQ1800VS-126 (2)
			25…40	IQ3000VS-126 (2)
			50…60	IQ5000V16-126 (2)
			75…100	IQ8000V16-126 (2)
			125…150	DTS 3361 (3)
Control Circuit Air Conditioner Fuse Holder		208V AC	3.0…50	BM6031PQ
		460V AC	3.0…5.0	No Air Conditioner
			7.5…100	BM6031PQ
			125…150	BC6033P
Control Circuit Air Conditioner Fuse	FU8	208V AC	3.0…20	FNM-10
			25…30	FNM-12
			40…50	FNM-20
		460V AC	3.0...5.0	No Fuse
			7.5…40	FNM-10
			50…60	FNM-12
			75…100	FNM-20
			125…150	ATQR-10

Table 8 - Enclosure Parts for NEMA/UL Type 4 (continued)

Description	Designation	Voltage	Hp	Part Number
Air Conditioner Filter Media		208V AC	3.0	No Filter
			5.0…50	Media is washable
		460V AC	3.0…5.0	No Filter
			7.5…20	Media is washable
			25	POF1019-GAL (2)
			30…100	Media is washable
			125…150	18881500002 (3)
Control Circuit Heater Fuse Holder		208V AC	3.0…50	BM6031PQ
		460V AC	3.0…150	BM6031PQ
Control Circuit Heater Fuse	FU7	208V AC	3.0…20	FNM-2
			25…50	FNM-3.2
		460V AC	3.0…40	FNM-2
			50…150	FNM-3.2
Heater		208V AC	3.0…30	D-AH1001A (4)
			40…50	D-AH2001A (4)
		460V AC	3.0…60	D-AH1001A (4)
			75…150	D-AH2001A (4)

(1) Manufactured by Acme Electric.
(2) Manufactured by Ice Qube Inc.
(3) Manufactured by Pfannenberg Inc.
(4) Manufactured by Hoffman Enclosures Inc.

Notes:

History of Changes

This appendix summarizes the revisions to this manual. Reference this appendix if you need information to determine what changes have been made across multiple revisions. This may be especially useful if you are deciding to upgrade your hardware or software based on information added with previous revisions of this manual.

23C-IN001B-EN-P, June 2013

Change
Removed all content related to the discontinued 3 Contactor Basic Bypass with Disconnect Package (Style C)

23C-IN001C-EN-P, November 2015

Topic
Updated the schematic drawings for the following drive packages to include the new circuit breaker: • 200 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1 • 200 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1 • 250…350 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 1 • 250…350 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 1 • 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 1 of 2) - NEMA/UL Type 3R • 3.0…50 Hp, 208V AC and 3.0…150 Hp, 460V AC Drives (Sheet 2 of 2) - NEMA/UL Type 3R
Updated the layout drawings for the following drive packages to include the new circuit breaker: • 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives - NEMA/UL Type 1 • 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives - NEMA/UL Type 1 • 25…30 Hp, 208V AC Drives - NEMA/UL Type 1 • 50…75 Hp, 460V AC Drives - NEMA/UL Type 1 • 40 Hp, 208V AC and 100 Hp, 460V AC Drives - NEMA/UL Type 1 • 50 Hp, 208V AC Drives - NEMA/UL Type 1 • 125…150 Hp, 460V AC Drives - NEMA/UL Type 1 • 200…250 Hp, 460V AC Drives - NEMA/UL Type 1 • 300…350 Hp, 460V AC Drives - NEMA/UL Type 1 • 3.0…5.0 Hp, 208V AC and 3.0…10 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1 • 7.5…10 Hp, 208V AC and 15…20 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1 • 15…20 Hp, 208V AC and 25…40 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1 • 25 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1 • 30 Hp, 208V AC Drives with Line Reactor - NEMA/UL Type 1 • 50…60 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1 • 40…50 Hp, 208V AC and 75…100 Hp, 460V AC Drives with Line Reactor - NEMA/UL Type 1
Added new 460V AC, 250 Hp, 300 Hp, and 350 Hp disconnect switch part numbers to the Disconnect Parts table for the Style Allen-Bradley Fused Disconnect Packages.
Added new 208V AC and 460V AC circuit breaker part numbers to the Disconnect Parts table for the Style M/N Circuit Breaker Packages.
Added new operator handle kit part numbers to the Disconnect Parts table for the Style M/N Circuit Breaker Packages.
Added new terminal lug part numbers to the Disconnect Parts table for the Style M/N Circuit Breaker Packages.
Add new Appendix C - History of Changes

Notes:

Rockwell Automation Support

Use the following resources to access support information.

Technical Support Center	Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.	https://rockwellautomation.custhelp.com/
Local Technical Support Phone Numbers	Locate the phone number for your country.	http://www.rockwellautomation.com/global/support/get-support-now.page
Direct Dial Codes	Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer.	http://www.rockwellautomation.com/global/support/direct-dial.page
Literature Library	Installation Instructions, Manuals, Brochures, and Technical Data.	http://www.rockwellautomation.com/global/literature-library/overview.page
Product Compatibility and Download Center (PCDC)	Get help determining how products interact, check features and capabilities, and find associated firmware.	http://www.rockwellautomation.com/global/support/pcdc.page

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