

Operation and Maintenance Manual

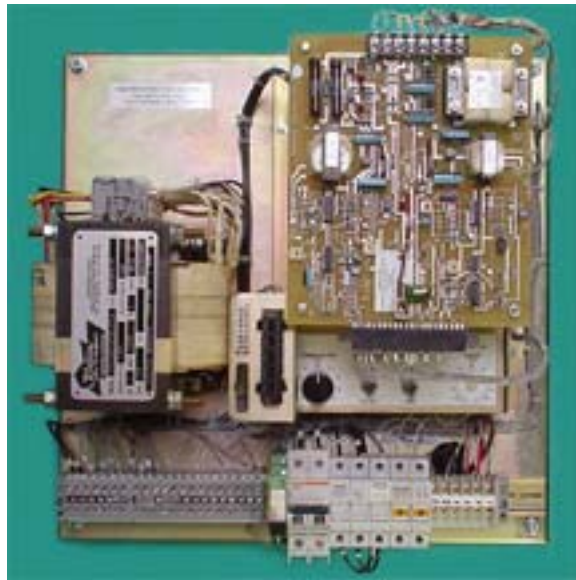
For

Kinetics Model KNB1C001PB11O

Exciter Regulator for Brushless Synchronous Motors

**Input : 120VAC, 1 phase, 60 Hz.
1.5 KVA 12.9 Amps**

**Output: 1.1 KW, 125 VDC, 9 amps DC
With taps rated 100VDC, 85VDC, and 65VDC**



These regulators are designed for maximum output at 40°C ambient. When installing the regulator in an enclosure, either with other equipment or alone, adequate ventilation must be provided to prevent exceeding this operating ambient temperature.

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Table of Contents For Kinetics KNB1 Exciter Regulator

Description of KNB1 Exciter Regulator	Page 4
Connections to KNB1 Exciter Regulator	Page 5
Description of Operation of KNB1 Exciter Regulator	Page 7
Description and Adjustment of TRIG1-HS-HS Circuit	Page 7
Changing Transformer Taps	Page 9
Trouble Shooting Guide	Page 10
Bill of Materials and Recommended Renewal Parts	Page 11
Drawings : Regulator Schematic Trig Simplified Schematic Connection Diagram when used with KinetSync-NB Connection Diagram with Generic Other Controls Mechanical of Exciter Regulator Panel	Page 12
Compliance with UL and CUL Testing	Page 17

Description of Kinetics KNB1 Exciter Regulator

The Kinetics type KNB1 exciter regulator is a single phase; SCR controlled rectifier with embellishments for primary use as a brushless synchronous motor off-shaft exciter and application control. The power semiconductor pak consists of a two-pulse hybrid bridge rectifier with commutating or free-wheeling device to provide both rectification with freewheeling current ripple suppression, output control, and static application of field excitation.

The KNB1 is provided with a Din rail mounted, two pole molded case circuit breaker, which provides both input circuit protection and a means of manual disconnecting from the AC power.

The basic standard exciter design is for single phase, 120VAC input. The isolation Exciter Power Transformer (EPT) can also be provided with 208 VAC or 240 VAC primary windings.

The EPT has a multiple tapped secondary winding to enable the standard exciter rated output to be limited to 125, 100, 85 or 60 VDC allowing the regulator to be tailored to motor rated excitation voltages. (See voltage tap changes). The EPT also has an isolated auxiliary winding to provide fused control power for the regulator electronics and for other remote devices such as *KinetSync-NB*, *Kinetics PFSensor* or *Kinetics PFTRP* power factor relay.

The input to the power rectifier has been fused with current limiting, semiconductor fuses. AC input noise and transient suppression is provided by both an R-C snubber network and an MOV (metal oxide varistor). An MOV and a heavy bleed resistor provide DC or output suppression. The power semiconductor package is mounted on an extruded aluminum heat sink for thermal dissipation and is rated at 1200 PRV to withstand inductive transients. Isolating, Hall effect, DC voltage and current sensors are mounted on the power pak circuit board.

Control and triggering of the power SCRs are incorporated in the TRIG1-KIN-HS circuit board. The Trig1-KIN-HS circuit acts as the controlling element of the closed loop regulated exciter. This circuit provides the signal mixing and logic to adjust the SCR triggers to maintain the desired exciter output under changing conditions. The circuit also provides static current limit and IOC (immense overcurrent) protection for the regulator and the motor field. The exciter operates normally as a voltage regulated device. When power factor control is desired, the power factor signal is used as a vernier signal in co-ordination with the voltage regulation to maintain motor power factor at a desired level. The power factor signal required is a plus/minus signal from lead to lag with a null at 1.0 power factor. (The *KinetSync-NB* or *Kinetics PFSensor* controls provide such a signal.)

The KNB1 regulator is provided with a CT/PT input module. This module is a termination point for customer CT and PT signals required for motor power factor calculation. When the regulator is used in conjunction with either the *KinetSync-NB* controller/monitor or the *Kinetics PFSensor module* as an excitation system, these controllers will use these signals to generate regulating power factor signals to the KNB1 regulator.

The KNB1 regulator provides its own regulated reference voltage. An operator's potentiometer is located remotely for manual adjustment of the regulator output. For remote control, an external reference signal of the correct polarity and magnitude can be utilized and interjected into the wiper arm-com terminals (31-30). By external switching, the regulator can be controlled by either the manual pot or the remote reference signal.

The control panel of the regulator has the following controls:

- ◆ Power Factor Set potentiometer – used to adjust sensitivity of regulator to remote power factor signal (If the regulator is used with power factor controller such as a *KinetSync-NB* or *Kinetics PFSensor*)
- ◆ Power Factor Regulator Enable-Disable switch (if regulator is used with power factor controller such as a *KinetSync-NB* or *Kinetics PFSensor*)
- ◆ Rectifier Test Switch (Test-Run) for test operation of the rectifier from the control panel without activating external controlling elements such as a *KinetSync-NB* or running the motor.
- ◆ Mounting position for Output Set reference pot when it is desired to be internal rather than external

Connections to Kinetics KNB1 Exciter Regulator

When used with *KinetSync-NB* controller/monitor

Input Power:

Single-phase power is connected to Terminals L1 and L2 at the input to the isolating circuit breaker located on the DIN rail terminal strip at the bottom of the regulator panel.

Output:

The exciter DC output is provided at terminals 10 (+) and 11 (-) located on the DIN rail terminal strip at the bottom of the regulator panel.

Control:

A multi-conductor receptacle is provided for use with an umbilical multi-conductor control cable, which plugs directly onto a *KinetSync-NB* controller/monitor for brushless synchronous motor control. This cable provides the necessary connections between the *KinetSync-NB* and the regulator for activating the regulator output at the correct time, monitoring the motor field volts and amps, monitoring the power factor, protecting against field failure, pulling-out of synchronization, and failure to synchronize, annunciation of synchronization, time lock-out of re start, and trip of motor on any control failure.

A second multi-conductor receptacle is provided for connection to the reference setting potentiometer and a power on indicator normally mounted on enclosure door.

A Din rail mounted terminal strip is provided at the bottom of the panel for customer Start contact connection (terms 55 and 57), and customer motor controller interaction contacts including re-start timed lockout (56K terms 80 and 81), remote synchronization annunciation (FAX terms 82 and 83) and field failure (FAL- form c contacts terms 84, 85, and 86) interlock with motor trip circuit.

The PT/CT input module provides terminals for connecting the customer phase A-B PT connections and the phase C CT connection. (Kinetics provides aux CTs mounted on a jumper between the input CT terminals, which have less than 1 ma CT burden)

The Hall effect Voltage and current transducers connect to the *KinetSync-NB* via transducer sensor cables with plug-on terminations supplied with the *KinetSync-NB*.

When used alone with no external control/monitoring:

Input Power:

Single-phase power is connected to Terminals L1 and L2 at the input to the isolating circuit breaker located on the DIN rail terminal strip at the bottom of the regulator panel.

Output:

The exciter DC output is provided at terminals 10 (+) and 11 (-) located on the DIN rail terminal strip at the bottom of the regulator panel.

Control:

A multi-conductor receptacle is provided for use with an umbilical multi-conductor control cable, which can go to an auxiliary control panel or other than a *KinetSync-NB* controller/monitor for brushless synchronous motor control. This cable would be a customized cable for whatever interfacing is necessary to the external controls. To lock off the regulator from providing SCR triggers, it is necessary to provide a shorting means for wires 43 and 44 which show on

the schematic as normally closed FS contacts at the Trig1 ckt. If no auxiliary controls are utilized, the wires can be shorted via a dummy plug on the output receptacle and the regulator can be controlled on-off manually by utilizing the

regulator test switch on the regulator control panel. A second multi-conductor receptacle is provided for connection to the reference setting potentiometer and a power on indicating light normally mounted on enclosure door or the potentiometer can be mounted on the position for it on the regulator control panel. .

The PT/CT input module provides terminals for connecting the customer phase A-B PT connections and the phase C CT connection. (Kinetics provides aux CTs mounted on a jumper between the input CT terminals, which have less than 1 ma CT burden). If no power factor control or protection is being utilized, there is no connection required to these terminals. If either the *Kinetics PFTRP* (power factor trip relay) or *PF Sensor* (power factor transducer) are used then the PT and aux Pt signals can be obtained from the umbilical plug).

When used with external control/monitoring:

The KNB1 is adaptable for use with other controlling schemes and the interconnection between these schemes and the KNB1 can be accomplished by utilizing the connections available on either of the output receptacles and/or the DIN rail terminal strip at the bottom of the regulator panel.

Input Power:

Single-phase power is connected to Terminals L1 and L2 at the input to the isolating circuit breaker located on the DIN rail terminal strip at the bottom of the regulator panel.

Output:

The exciter DC output is provided at terminals 10 (+) and 11 (-) located on the DIN rail terminal strip at the bottom of the regulator panel.

Control:

A multi-conductor receptacle is provided for use with an umbilical multi-conductor control cable, which can go to an auxiliary control panel or other than a *KinetSync-NB* controller/monitor for brushless synchronous motor control. This cable would be a customized cable for whatever interfacing is necessary to the external controls. To lock off the regulator from providing SCR triggers, it is necessary to provide a shorting means for wires 43 and 44 which show on the schematic as normally closed FS contacts at the Trig1 ckt. (This is the location for the activating normally closed contact.) If no auxiliary controls are utilized, the wires can be shorted via a dummy plug on the output receptacle and the regulator can be controlled on-off manually by utilizing the regulator test switch on the regulator control panel. A second multi-conductor receptacle is provided for connection to the reference setting potentiometer and a power on indicator normally mounted on enclosure door or the potentiometer can be mounted on the position for it on the regulator control panel. .

The PT/CT input module provides terminals for connecting the customer phase A-B PT connections and the phase C CT connection. (Kinetics provides aux CTs mounted on a jumper between the input CT terminals, which have less than 1 ma CT burden). If no power factor control or protection is being utilized, there is no connection required to these terminals. Note: The auxiliary CTs provided on the module are selected for use with a *KinetSync-NB* and may or may not be suitable for alien controllers.

Description of Operation of KNB1 Regulator

Power is applied to the regulator when the AC input circuit breaker is closed. The regulator is in an "OFF" condition (no SCR triggers) until the TRIG1-KIN-HS circuit is activated by opening the shorting means for wires 43 and 44 (when a relay is utilized this is the notated NC FS contacts)

The KNB1 regulator is a closed loop regulator. The reference signal, set by the reference setting potentiometer, is an "ON" signal. The loop is closed on the regulator output voltage. These two signals are compared at the summing junction and the result provides the triggering to the power SCRs to turn on and control the regulator output. If power factor control is utilized the power factor signal is fed into this same junction and compared with the reference and feedback signals at the summing junction. Adjusting the amplitude of the "ON" signals correspondingly adjusts the output of the regulator.

The regulator provides both static switching and regulation of the load. Disabling the SCR triggers turns off the regulator output.

Description and Adjustment of TRIG1-KIN-HS Circuit

Control and triggering of the power SCRs are incorporated in the TRIG1-KIN-HS circuit board. The Trig1-KIN-HS circuit acts as the controlling element of the closed loop regulated exciter. This circuit provides the signal mixing and logic to adjust the SCR triggers to maintain the desired exciter output under changing conditions. The circuit also provides static current limit and IOC (immense over current) protection for the regulator and the motor field. The exciter operates normally as a voltage regulated device. When power factor control is desired, the power factor signal is used as a vernier signal in co-ordination with the voltage regulation to maintain motor power factor at a desired level. The power factor signal required is a plus/minus signal from lead to lag with a null at 1.0 power factor. (The *KinetSync-NB* or *Kinetics PFSensor* controls provide such a signal.)

The TRIG1-KIN-HS circuit has two isolated and regulated power supplies, which provide operational voltage for the circuit elements and the reference voltage for the setting potentiometer. A third power source provides isolated SCR trigger power of the correct polarity.

The reference signal is interjected into the linear ramp generator (pts 20-19), which provides an adjustable timed rate of field change to a reference input change. The output of the ramp generator is applied to the summing junction.

The feedback signal (regulator volts) is interjected into the feedback co-ord amplifier (FB1-FB2) whose output is compared with the reference signal at the summing junction.

If power factor regulation is desired the power factor signal is also interjected (pts 16-19) into the summing junction. (the power factor signal must be a plus/minus signal with null at 1.0 power factor)

The output of the summing junction is applied to the signal mixing amplifier. The output of the signal mixing amplifier is fed to the error amplifier. The output of the error amplifier provides the regulator amp output, which is used to activate the trigger pulse generators. The amplitude of the regulator amp output sets the phasing of the SCR triggers. The outputs of the trigger pulse generators are placed on isolating optical SCRs to, in turn, fire the Trigger pulse amplifiers providing isolated SCR triggers of the proper phasing to control the SCR's outputs. (Longer phase delay means shorter SCR conduction time and thus lower regulator output.

The current protective circuits provide current limiting and IOC by effectively either reducing the regulator output by shorting the summing junction output (current limit - analog reduction) or shorting the regulator amp output (IOC - latching function with LED indication). A current signal is provided by the Hall effect sensor on the power pak. This signal is interjected into the current protective circuit (pt 11-10).

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Current limit - the current signal is amplified in the signal amplifier and compared against a preset reference signal. The output is then applied to the set/slope amplifier. If the amplified signal is greater than the reference set point, a CL "on" is applied to the optical coupler (OTR-1), which turns on the optical transistor (OTR-1) reducing the error input signal.

IOC - the current signal is compared against a preset reference signal. The output is then applied to the IOC comparator. If the amplified signal is greater than the reference set point, an IOC "on" is applied to the IOC delay amplifier. (this delay amplifier allows a time delay before activating IOC). After the IOC delay the IOC "on" is applied to the optical coupler (OC3), which turns on the optical SCR (OC3) shorting the regulator amplifier output and providing an IOC LED indication. The SCR is a latching device. Once activated, power must be removed from the TRIG1-KIN-HS circuit for IOC reset.

Adjustments:

Adjust rate of reference input adjustment - adj P1 cw to slow down the ramp -LAM Slope

Adjust maximum output of regulator - adj P3 cw to increase regulator output for a given reference input - FB Adj

Adjust activation point of Current Limit - adj P6 cw to increase current limit point - C.L ADJ
(Standard factory setting is 12.5 amps)

Adjust sensitivity of Current Limit - adj P7 cw to increase effect of current limit - C.L. SLOPE

Adjust IOC set point - adj P5 cw to raise IOC operating point - IOC ADJ
(Standard factory setting is 15 amps)

Adjust stability of regulator - adj R7 (pot) cw to increase gain of signal mixer (proportional gain) - GAIN
- adj P2 cw to increase time of response (differential/integral gain) - TIME

Adjustment procedures:

Adjusting maximum output of regulator.

- Set the Reference Setting Potentiometer to minimum
- Activate the regulator (this can be done with or without load)
- Raise Reference Setting Potentiometer to maximum position. If output is not correct for the transformer tap setting, adjust P3 (FB adj) until proper output voltage is achieved.
(Standard factory adjustment is to 125 VDC on 125VDC transformer tap)
(For other max volts see Changing Transformer Taps)

Adjusting Current Limit point:

To make this adjustment a load must be applied to the regulator suitable to achieve the desired current limit point at some position below max voltage.

The current limit point can be seen as the point where current caps even with an increase in the Reference Setting Potentiometer position.

- Set the Reference Setting Potentiometer to minimum
- Activate the regulator
- Raise Reference Setting Potentiometer until the desired current limit point is achieved
(If the current limit point is achieved before max voltage is achieved and you want to increase the activation point, simply adjust the C.L ADJ until the desired point is obtained.)
(If the current limit point is not achieved before max voltage is achieved and you want to increase the activation point, you will have to either change the load or increase the volts by changing the transformer tap then proceed as above- See changing transformer taps)
(If the current limit point is achieved before max voltage is achieved and you want to decrease the activation point, simply adjust the C.L ADJ until the desired point is obtained.)

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(If the current limit point is not achieved before max voltage is achieved and you want to decrease the activation point, simply adjust the C.L ADJ until the desired point is obtained.)

Adjusting IOC point:

To make this adjustment a load must be applied to the regulator suitable to achieve the desired IOC point at some position below max voltage. You will have to disable the current limit control before making this adjustment as the current limit will activate before the IOC and therefore not normally allow you to reach the IOC point. Note: to reset after IOC activation you must remove power.

NOTE: The factory IOC setting (15amps) is the maximum it should be set. Raising the IOC setting above this point leaves the regulator subject to damage and any warranties will be voided.

The IOC activation is indicated by the IOC LED illuminating

- Set the Reference Setting Potentiometer to minimum
- Activate the regulator
- Raise the Reference Setting Potentiometer until the desired point of IOC trip is achieved
(If the IOC point is achieved before max voltage is achieved and you want to decrease the activation point, then adjust the Reference Setting Potentiometer to the desired current point and then adjust IOC ADJ until the IOC trips and the LED illuminates.)
(If the current limit point is not achieved before max voltage is achieved and you want to decrease the activation point, you will have to either increase loading (decrease resistance) or raise the regulator output volts and then proceed as above)

Adjusting regulator stability:

Normally these adjustments should only be made by trained regulator personnel.

Pots R7 and P2 adjust the proportional gain and the time slope of the regulator.

They are somewhat interactive and adjust the bode interactive point of the regulator. The adjustment, if required, should be made on start-up by the start-up engineer and it is not recommended that any adjustments be made by non-trained personnel.

Changing Transformer Taps

The regulator will attempt to maintain the output voltage set by the reference setting signal regardless of the input voltage within the limits of the regulator to do this. The maximum voltage output of the regulator is limited by the AC voltage on the secondary of the transformer. Making a transformer tap change to change the regulator maximum output also requires a regulator adjustment for the regulator to function properly. The standard factory transformer tap connection is at 125VDC. Lowering the tap without readjusting the max or FB adj will create a condition where the regulator voltage output will rise to the transformer voltage limited point at a point below 100% on the reference setting potentiometer. If the regulator has been properly adjusted for a lower tap and then the tap is raised, a condition will be created where the voltage output of the regulator will only go to the lower max set voltage at 100% on the pot.

Adjustment necessary when changing transformer taps.

After changing the transformer tap set the reference setting potentiometer to minimum and activate the regulator.

Adjust the reference setting potentiometer to maximum.

Adjust the FB adj pot (P3) ccw to lower the voltage to the desired level or cw to raise it.

(100% setting on the reference setting pot should provide the desired maximum volts)

Trouble Shooting Guide

Symptom : No output

Possible Causes :

- No line power or open circuit breaker - Restore line power or reset and close circuit breaker
- Open Power Fuses (FU1-FU2) - Check for load shorts - clear and replace fuses
- Open control power fuse Fu1 - Check for shorts, clear and replace fuses
- No reference signal - Open control fuse, shorted wiring to pot, defective Trig1 ckt
- Defective Semi-conductors - Check for load shorts and open power fuses then replace
- Regulator not activated - Check remote control ckt and that FS contacts (NC) are activated

Symptom : Volts won't reach max

Possible Causes:

- Output overload and regulator is in current limit - Check for shorts on output- possible motor on-shaft electronic problems
- Transformer tap was changed and regulator adjusted properly
- Incorrect reference signal - check reference setting pot and reference input signal
- Defective Trig1 or open or shorted SCR gate - Ascertain triggers are present on SCR gate (Are trigger LEDs on TRIG1 illuminated?)

Symptom: Volts turn full on - no control

Possible Causes:

- Loss of Feedback - check to see that volts transducer output to TRIG1 is there (pts TB7-TB8)
- Defective Volts transducer or open wiring - replace transducer or repair wiring

Symptom: Open Power Fuses

Possible Causes:

- Shorts on output
- Shorted semi-conductors - some motors, when their on-shaft electronics fail, can produce high inductively coupled transients through the exciter to the regulator. This condition is normally indicated by a shorting of the free wheeling diode. Protection for the rectifier can be helped by incorporating a VERY heavy bleed but has the problem of preloading the regulator.

Symptom: tripped IOC

Possible Causes:

- Shorts on output of regulator - possible failure of on-shaft motor electronics

Symptom: Regulator in Current Limit

Possible Causes:

- Overload

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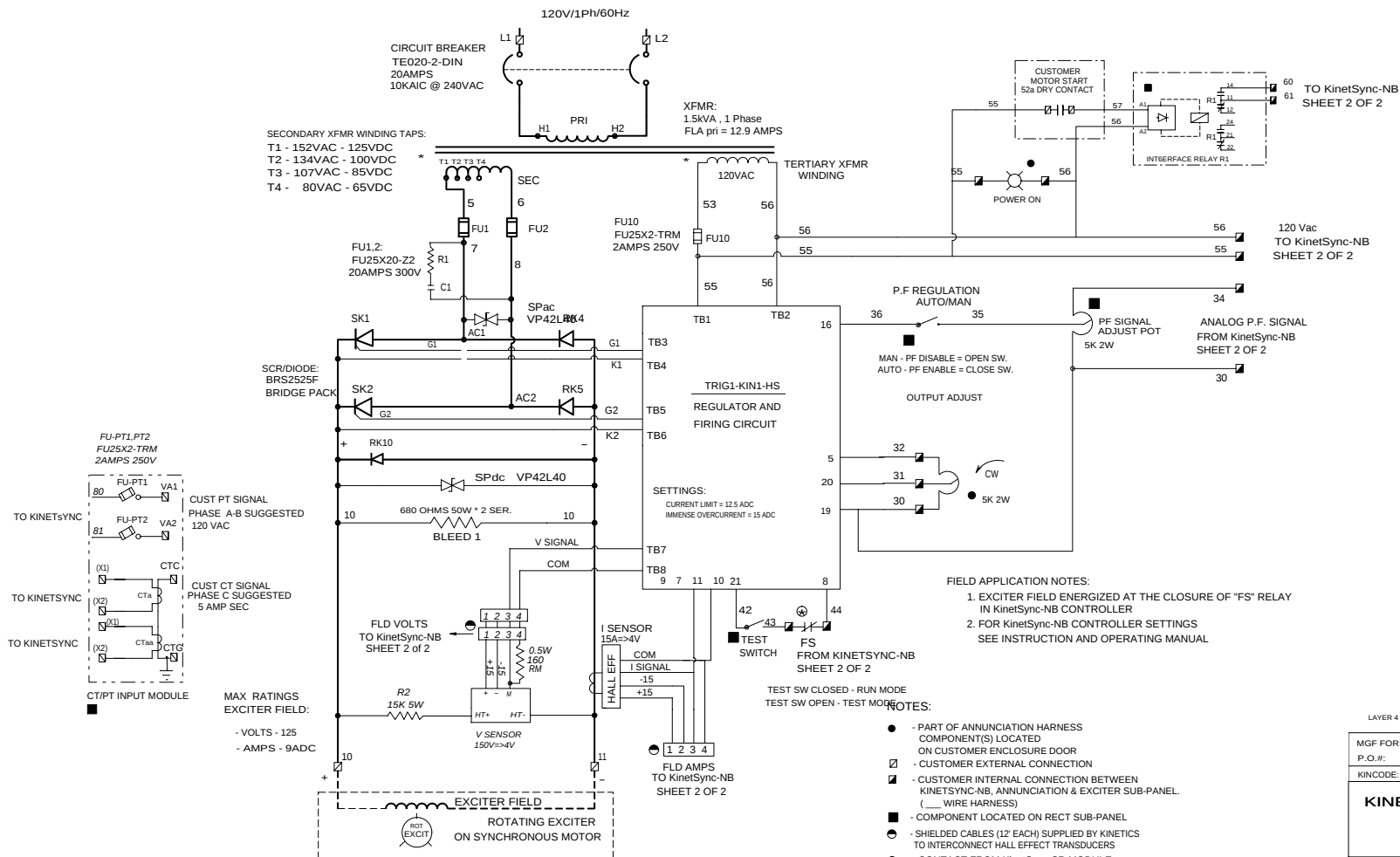
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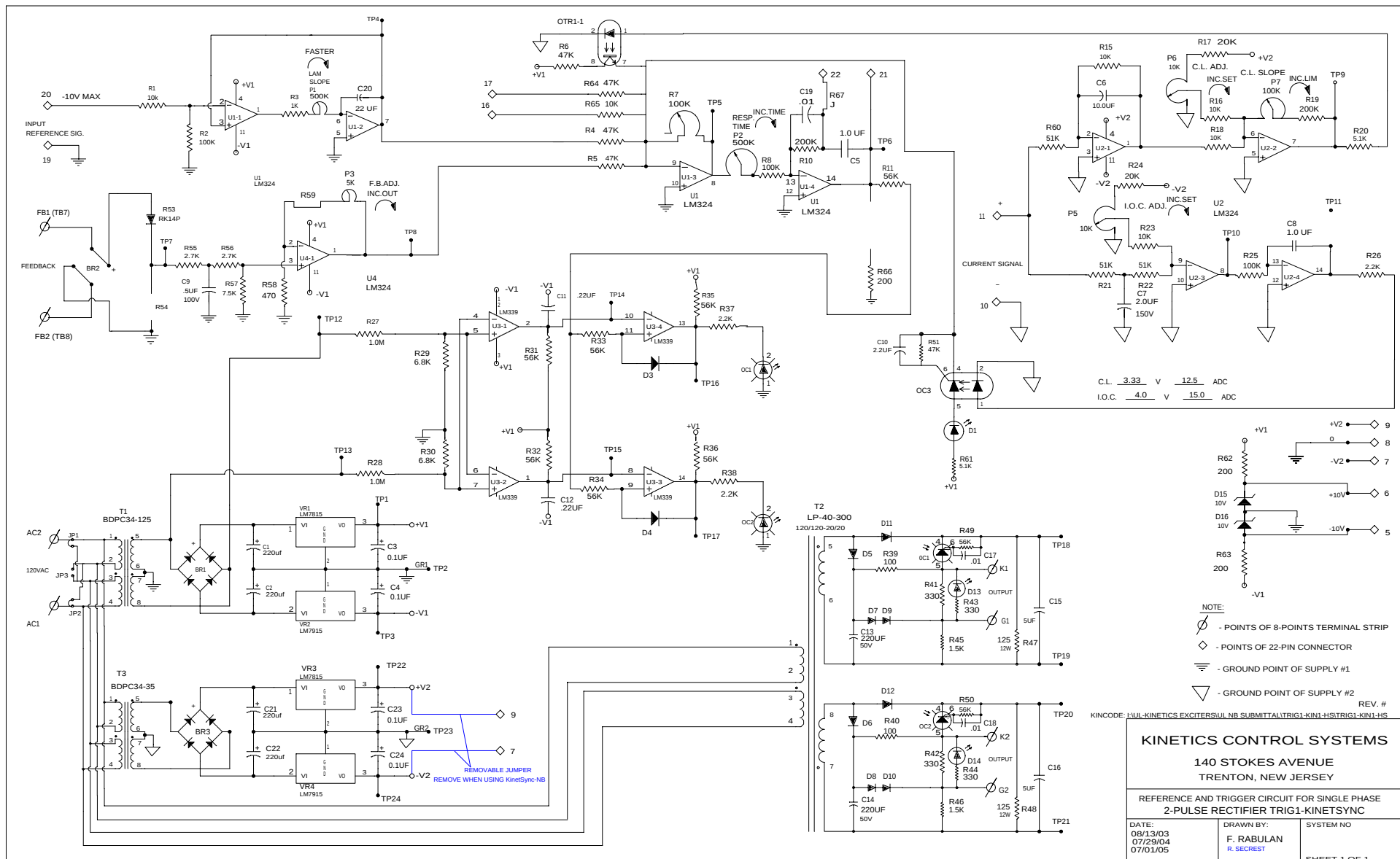
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Bill of Material and Renewal Parts

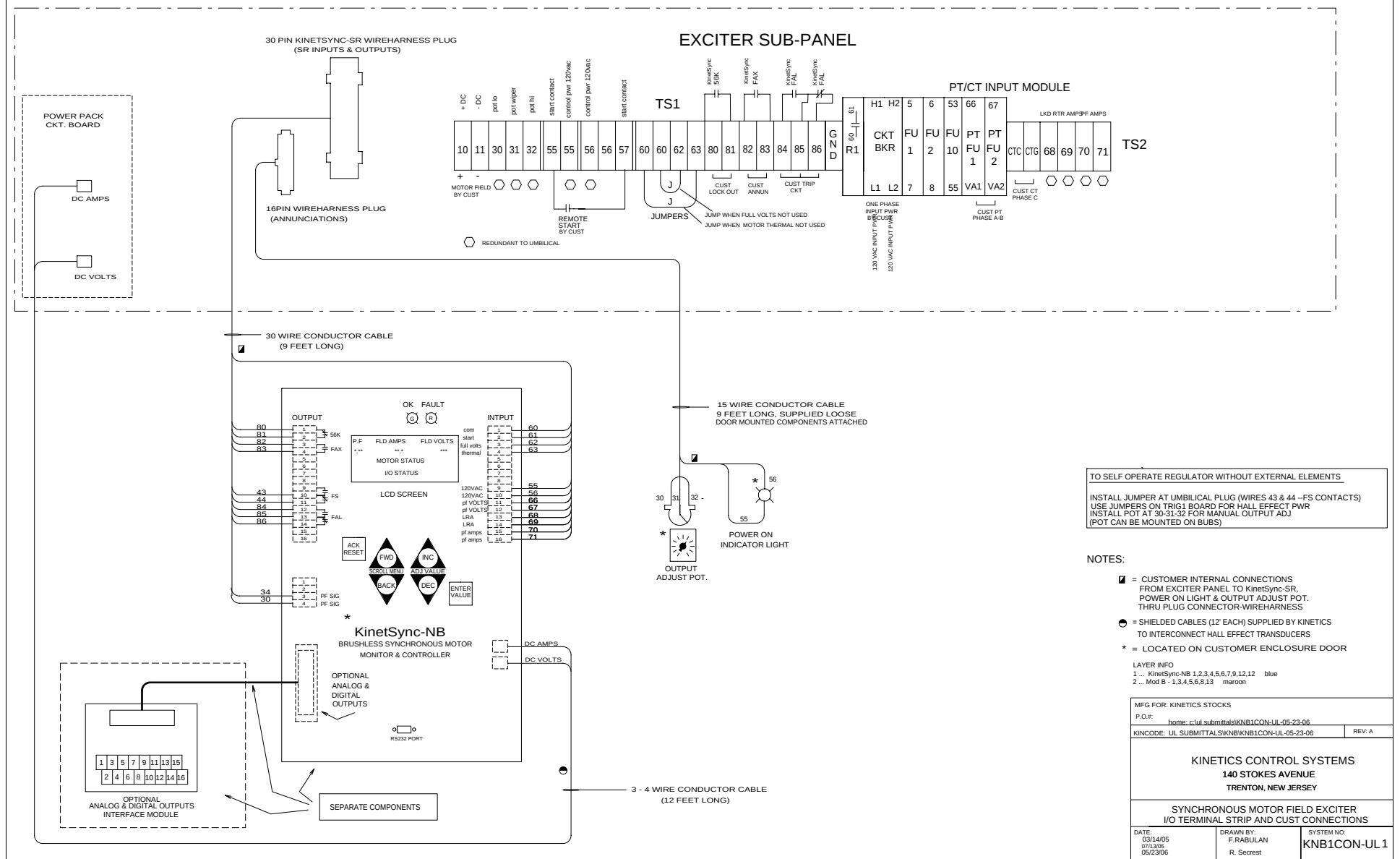
Description	Part Identity	Part Number	No in Reg.	Recommended Min Spares
Circuit breaker	CKT BKR	TE020-2-DIN	1	0
Exciter Transformer	XFMR	R001A61ZCO-CU#	1	0
Rectifier Fuse	FU1-FU2	FU25X20-Z2	2	4
Fuse Block		FUB2-30-60USM	1	0
Power Block Assy	SK1/2-RK2/5/10	SCR1-15-PWRBLK-A	1	1
Trigger/Ref Ckt	TRIG1	TRIG1-KIN1-HS	1	1
Control Fuse	FU10	FU25X2-TRM	1	2
Fuse Block		FUB1-30-60USM	1	0
Selector switch	Test - PF mode	TOGSPST06A1	2	0
ckt bd standoff -1.5"		STND2158	4	0
ckt bd standoff -1.25"		STND2156	4	0
ckt bd standoff -hinge		STNDHNG359	2	0
18"x18" panel		BS18X18-DIGI	1	0
Terminal blocks-Din		TB8M50AG	21	0
Terminal end stop		TB8M-END-STOP	4	0
Ground Terminal		TB8M-GRND	1	0
PT/CT Input Module		PT/CT-INPUT-NB	1	0
Umbilical Receptacle-30		WHPLUGNB30	1	0
Umbilical Receptacle-16		WHPLUGNB16	1	0
umbilical cable assy	KinetSync-NB-cable	WHPLUGNB30P/12FT	1	0
umbilical cable assy	KinetSync-NB-cable	WHPLUGNB16P/12FT	1	0



LAYER 4 - COMPS SUBJ TO MOD FOR MOD B AND OTHERS		
MGF FOR:		
P.O.#:	REV: A	
KINCODE: I: U:UL-KINETICS EXCITERS/UL NB SUBMITTAL/STD NBA UL		
KINETICS CONTROL SYSTEMS		
140 STOKES AVENUE		
TRENTON, NEW JERSEY		
SYNCHRONOUS MOTOR FIELD EXCITER		
STANDARD 1PH EXCITER (KNB1C01PB110-STD)		
DATE: 11/01/04 09/17/05 09/20/05	DRAWN BY: F. RABULAN R. Secrest R. Secrest	SYSTEM NO: STD NBA UL SHEET 1 OF 2

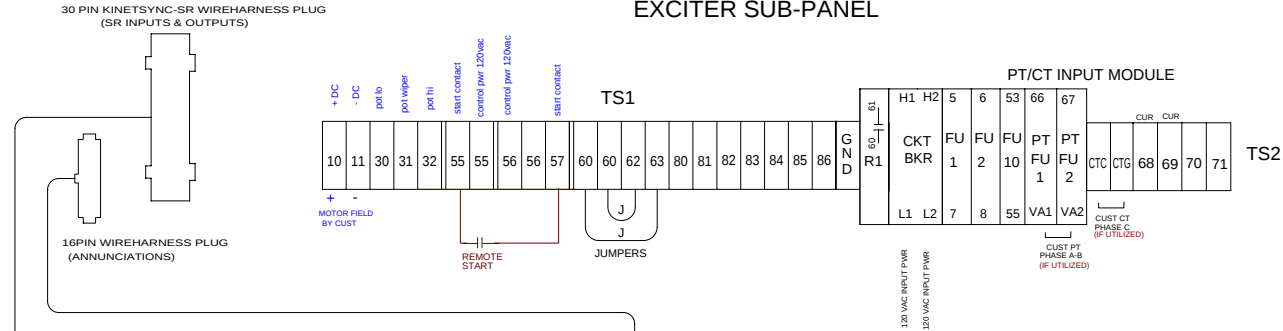


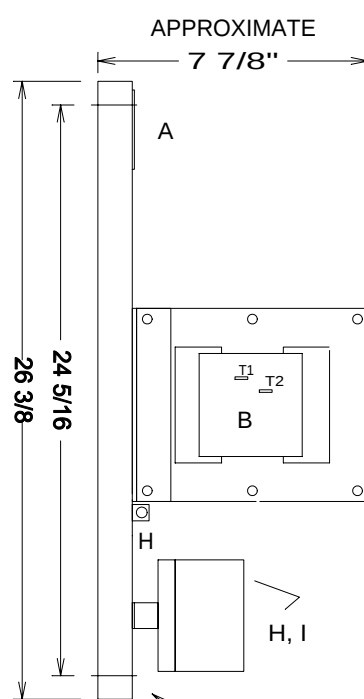
EXCITER RECTIFIER SUB-PANEL TO KinetSync-NB INTERCONNECTION DIAGRAM



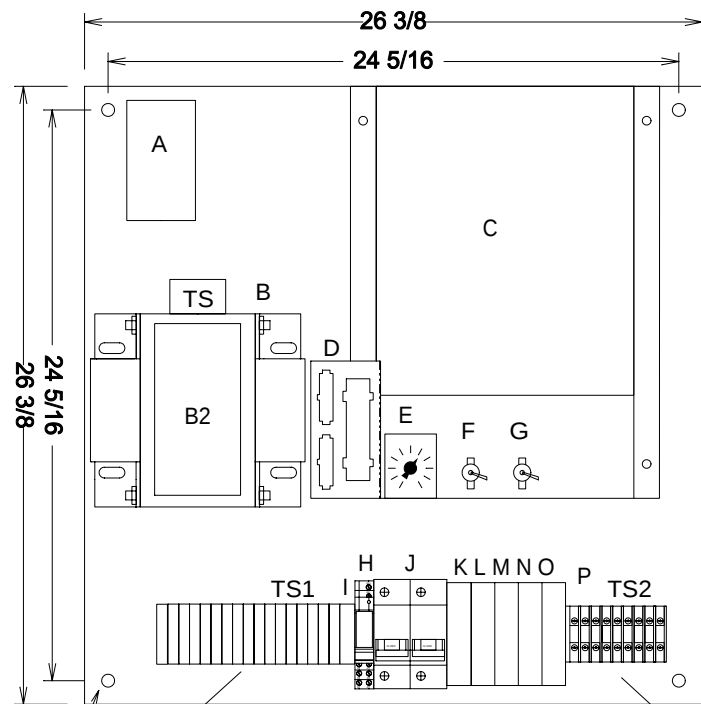
EXCITER RECTIFIER SUB-PANEL TO KinetSync-NB INTERCONNECTION DIAGRAM

EXCITER SUB-PANEL

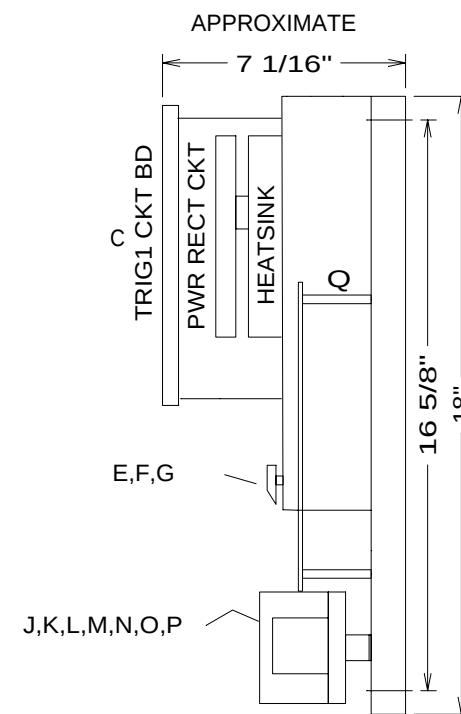




(4) 1/2" DIA. MTG HOLES



TERMINAL BLOCKS FOR CUSTOMER CONNECTIONS
SEE DETAILS ON CONNECTION DIAGRAM



COMPONENT DESCRIPTION

A - TRANSFORMER TAP POSITION NAMEPLATE
B - POWER TRANSFORMER
B1 - POWER TRANSFORMER I.D. NAMEPLATE
C - RECTIFIER ASSEMBLY - CONSISTS OF:
TRIG1 CKT TOP - PWR RECT MIDDLE - HEATSINK BOTTOM
D - KINETSYNC MODULE HARNESS PLUGS
E - PF ADJUST POTENTIOMETER
F - MODE OF REGULATOR SWITCH
G = TEST / RUN SWITCH
H = R1 MOTOR START INTERFACE RELAY

I = GND - DINRAIL MOUNTED
J = CKT BKR - DINRAIL MOUNTED
K = FU1 FUSE - DINRAIL MOUNTED
L = FU2 FUSE - DINRAIL MOUNTED
M = FU10 FUSE - DINRAIL MOUNTED
N = PT/FU1 FUSE - DINRAIL MOUNTED
O = PT/FU2 FUSE - DINRAIL MOUNTED
P = PT/CT MODULE - DINRAIL MOUNTED
TS1 & TS2 TERMINAL POINTS - DINRAIL MOUNTED
TS = TERMINAL STRIP - MOUNTED ON TRANSFORMER

MFG FOR:		
PO#:		
KINCODE: G:\Kinetsync NB SALES PROPOSAL\KNB1_PANEL_LAYOUT		
KINETICS CONTROL SYSTEMS		
140 STOKES AVENUE		
TRENTON, NEW JERSEY		
BS18X18KS-NB CONTROL BACKSHEET PROFILE		
KNB1C01PM110 EXCITER REGULATOR		
DATE: 08/09/05	DRAWN BY: RHS	SYSTEM NO.:
SHEET 1 OF 1		

Kinetics Industries Inc.

**140 Stokes Avenue
Trenton, NJ 08638**

**Phone: 609-883-9700
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UL and Canadian UL Compliance- file number E302181 issued 2005-12-22

These units have been submitted to UL Laboratories for examination and testing in compliance with the requirements of the Standard for Power Conversion Equipment in effect as of the date of the UL Testing Labs report (2005-12-22).

Short circuit tests were performed on submitted equipment and were found to be in accordance with the requirements in UL 508C.

These same units have been examined and tested by UL laboratories and are certified to be in conformance with Canadian National Standard C22.2.

The following information and markings are provided herein to comply with the applicable UL and Canadian standards.

1. "Use minimum 75'C wire only"
2. "Use copper conductors only"
3. Torque Markings:
Model KNB1C001PB1O
Input Breaker torque: "Tighten terminals to 22 lb-in"
Output Terminal Block torque: "Tighten terminals to 7.1-8.9 lb-in"
4. "Suitable for use on a circuit capable of delivering not more than 5.0 KA rms symmetrical amperes", where "@@@" is the input voltage of the device. This marking also includes the maximum voltage rating of the device.
5. "Integral solid state short circuit protection does not provide circuit protection. Branch circuit protection must be provided in accordance with the National Electric Code and any additional local codes."
6. "These devices provide solid state motor overload protection at 130% of FLA"

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C;\Description of Kinetics KNB1 Exciter Regulator

Operation and Maintenance Manual

For

Kinetics Model KNB1C001PB11O
Exciter Regulator for Brushless
Synchronous Motors - dtd 05/2006

Manufacturers of

- ◆ **SCR Exciter Regulators**
- ◆ **Line Regulated Diode Rectifiers through 2000 KW**
- ◆ **SCR Regulated Rectifiers through 2000 KW**
- ◆ **Synchronous Generator Excitation Systems**
- ◆ **Dry Type Transformers**
- ◆ **Magnet Power Supplies**
- ◆ **Flux Forcing Magnet Rectifiers**
- ◆ **Select-a-Pick Variable Voltage Magnet Rectifiers**
- ◆ **Elevator Power Supplies**
- ◆ **Crane Power Supplies**
- ◆ **Third Rail Powered Emergency Motor Generator Systems**

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