ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *ABB / Baldor 20-RL-7.5* at our website: *Click HERE*

BALDOR® ASR

BTS 10 R/RL-SERIES
BRUSHLESS SERVO AMPLIFIER

INSTRUCTION MANUAL

15472D

Version 4.0 2003/05

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BALDOR ASR GmbH has tried to ensure that the information given in this manual is correct at time of going to print.
However BALDOR ASR GmbH may not be held responsible for any typographical mistakes or errors in contents of this manual. The information is subject to change without prior notice.
BALDOR ASR GmbH would appreciate notice of any mistakes in the text.

BALDOR ASR GmbH October 1989

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Warning!

These instructions are for use by qualified personnel only.

In order to avoid electrical shock, do not perform any servicing other than that contained in the Operating and Service Manual unless you are qualified to do so.

Dangerous voltage exists on the screw terminals of power inlet and outlet when energized. Exercise extreme care when working on an energized circuit.

When a unit needs to be replaced, wait at least 2 minutes to allow a discharge of the power-capacitors and touch only the handle on the front-side. Use isolated tools for removal of connecting wires and avoid to touch the contacts.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CONTENTS

Page

BTS 10 R/RL Specifications 1

BTS 10 R Blockdiagram 2

BTS 10 RL Blockdiagram 3

BTS 10 R/RL - RBTS 10 Dimensions 4

Interconnection Diagram 5

System Connection Diagram 6

RBTS 10 Backpanel (Detailed) 7

RBTS 10 Backpanel (Fullsize) 8

BTS 10 R/RL Set-Up Procedure 9

Component Layout of Adjustable Parts on Resolver Card 10

BTS 10 R/RL Set-Up Procedure (Continuation) 11

Potentiometers 12

BTS 10 R/RL Testpoints 13

BTS 10 R/RL Testpoints (Continuation) 14

Identity Headers 15

BTS 10 R Location of Potentiometers, Testpoints and Headers .. 16

BTS 10 RL Location of Potentiometers, Testpoints and Headers . 17

BTS 10 R/RL Inputs, Hardware 18

BTS 10 R/RL Outputs, Hardware 19

BTS 10 R Schematic of Velocity Controller 20

BTS 10 RL Schematic of Velocity Controller 21

BTS 10 R Control Card Component Layout 22

BTS 10 RL Control Card Component Layout 23

Resolver Card Component Layout 24

BPS 10 R Description 25

BPS 10 R Circuit Diagram 26

BPS 10 R Dimensions 27

BPS 10 R Component Layout 28

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

CONTENTS

Page

BPS 10 R External Load Resistor 29

BTS 10 R/RL Protection Chokes 30

Transformer 31

User Notes 32

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

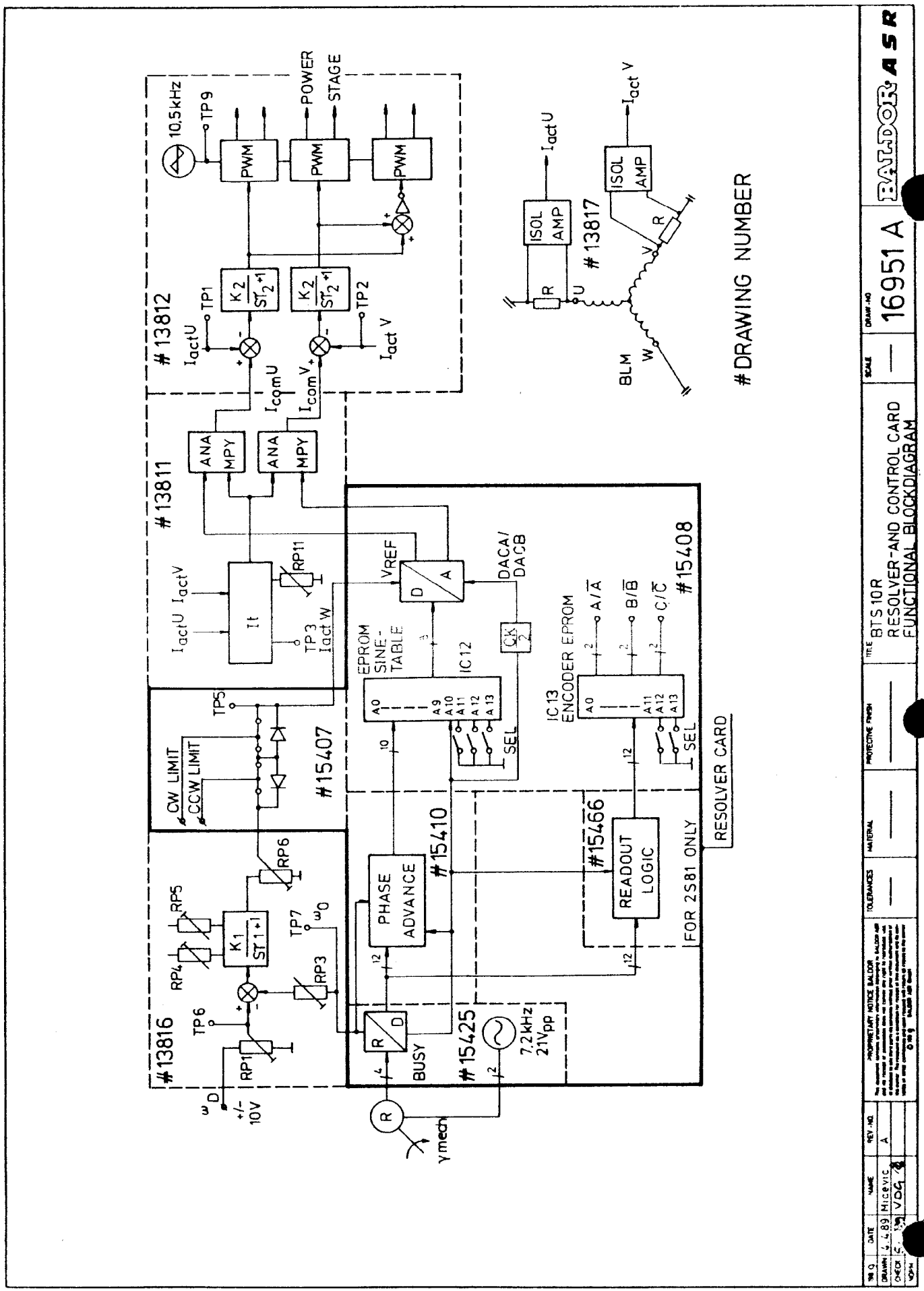
BTS 10 R/RL - DRIVE SPECIFICATION SHEET

PARAMETER	Units	200-1 RL	200-2.5 R/RL	200-5 R/RL	200-10 R	200-15 R	200-22.5 R
GENERAL							
Nom. DC Bus Voltage[1]	V DC	200.0					
Voltage Range	V DC	160 - 240					
Max. Output Voltage at nominal Bus (U_{LL})	V AC	153.0					
Cont. Phase Current	A(rms)	1.0	2.5	5.0	10.0	15.0	22.5
Max. Peak Current 2.5 s	A(rms)	2.0	5.0	10.0	20.0	30.0	45.0
Cont. Output Power	kVA	0.3	0.7	1.3	2.7	4.0	6.0
Switching Frequency	kHz	10.5	10.5	10.5	10.5	10.5	10.5
PREAMPLIFIER							
Input Impedance	kOhm	22					
Velocity/ Current Command	V	0 to +/- 10					
Gain Stability	%	+/- 1					
Gain Linearity	%	+/- 2					
Drift (referred to input)	μV/°C	+/- 10 max.					
Offset		adjustable to zero					
FEEDBACK CIRCUIT (Resolver)							
Resolution		12 Bit					
Encoder Simulation Option "C"	ppr	100 / 200 / 500 / 1000					
Signal		5 V TTL A, $\overline{A}$ B, $\overline{B}$ C, $\overline{C}$					
Reference Pulse		non-adjustable					
MECHANICAL							
Mounting		Rack					Rack
Dimensions 6 HE	mm	220x60					220x120
Weight	kg	RL: 0.9			R: 1.4		3.6

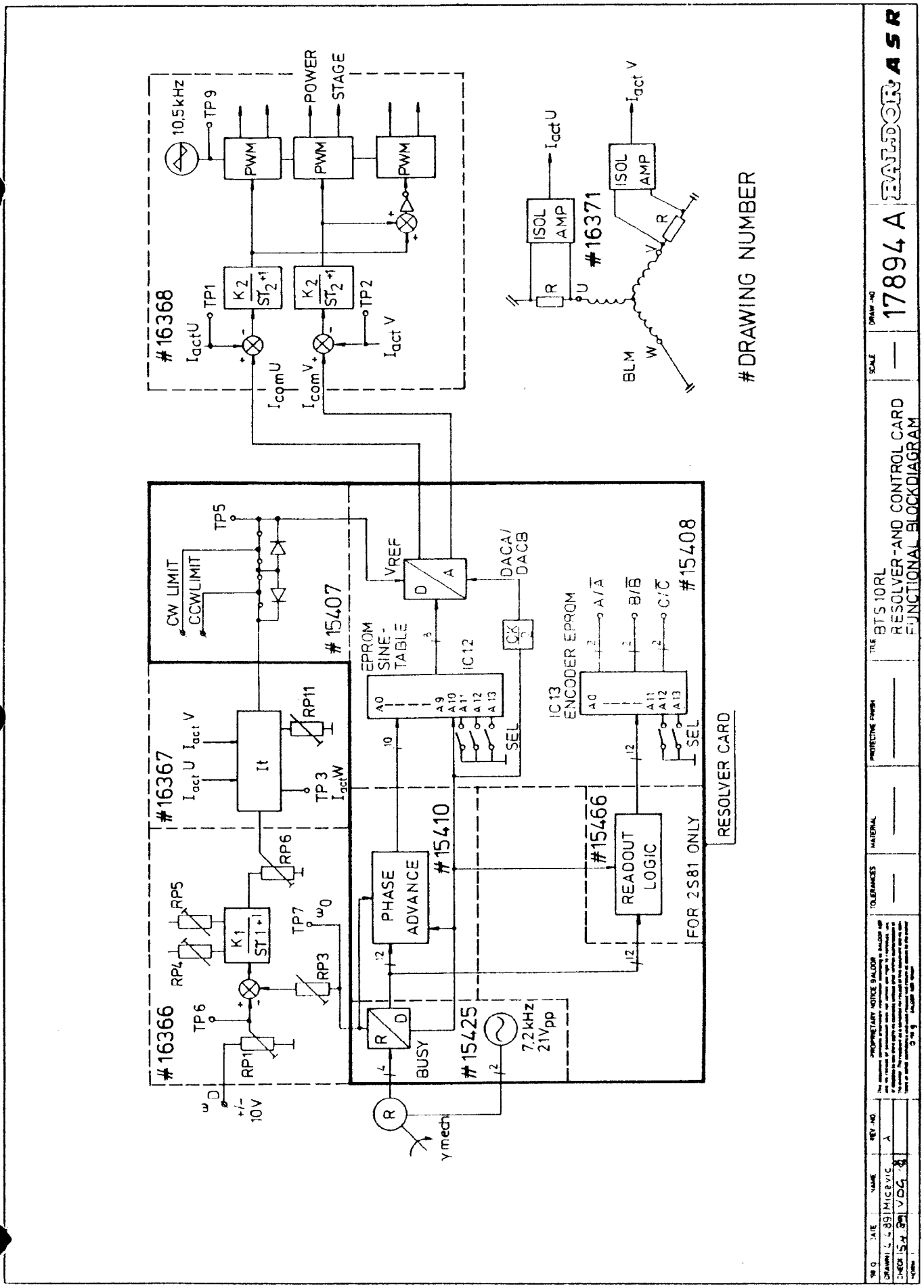
POWER SUPPLY BPS 10 R	Units	200-020R	200-040R	200-060R
Input Voltage 3-phase	V AC	140.0 ± 20 %		
Output Voltage	V DC	200.0 ± 20 %		
Cont. Output Current	A	20.0	40.0	60.0
Max. Output Current 2.5 s	A	40.0	80.0	120.0
Nominal Power	kW	4.0	8.0	12.0
Regeneration Switching Current	A	20.0	20.0	20.0
Regeneration Resistor (internal)[2]	W	80.0	80.0	80.0
MECHANICAL				
Mounting		Rack		
Dimensions	mm	6 HE 220 x 60		
Weight	kg	1.0		
TEMPERATURE BTS/BPS 10 R				
Ambient for Nominal Ratings	deg.C	25		
Operating Range	deg.C	0 to +45		
Storage	deg.C	-20 to +70		

[1] 24/48 V also available [2] or 320 W external on order

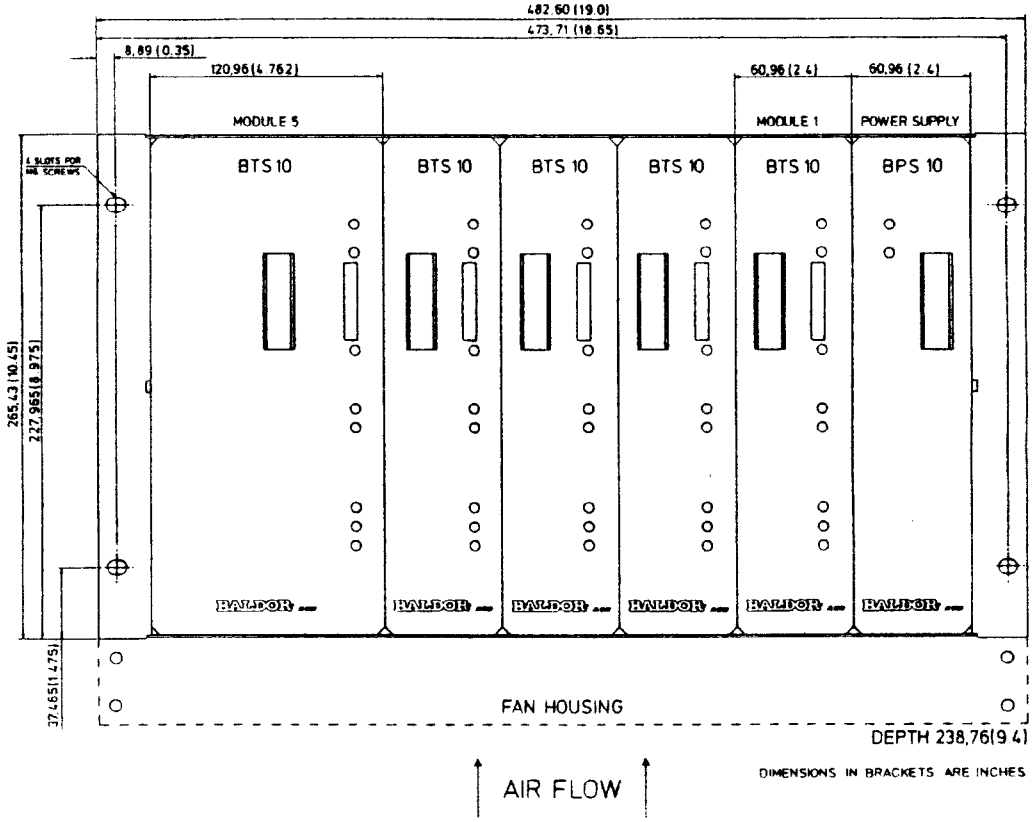
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



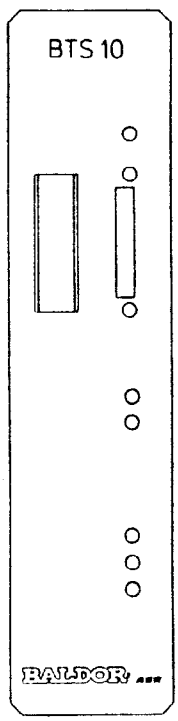
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

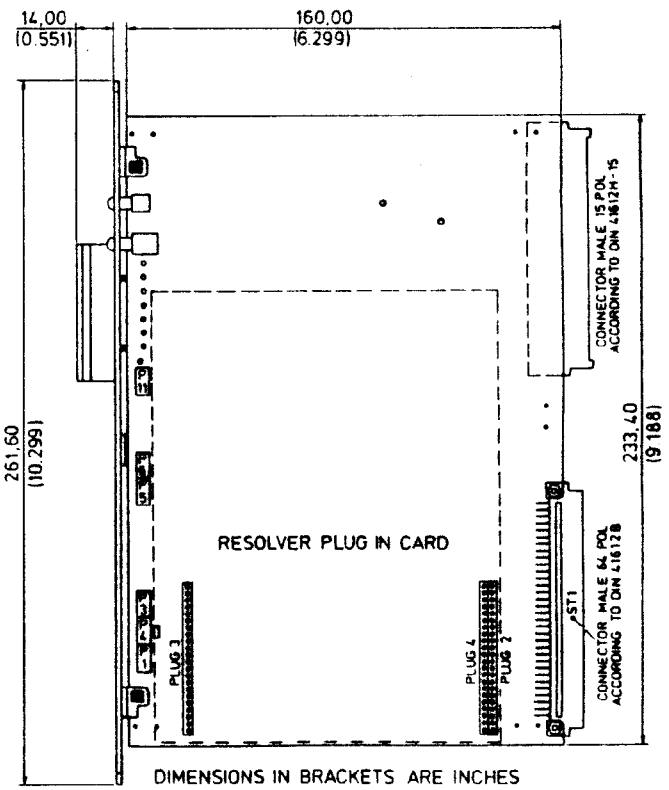


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

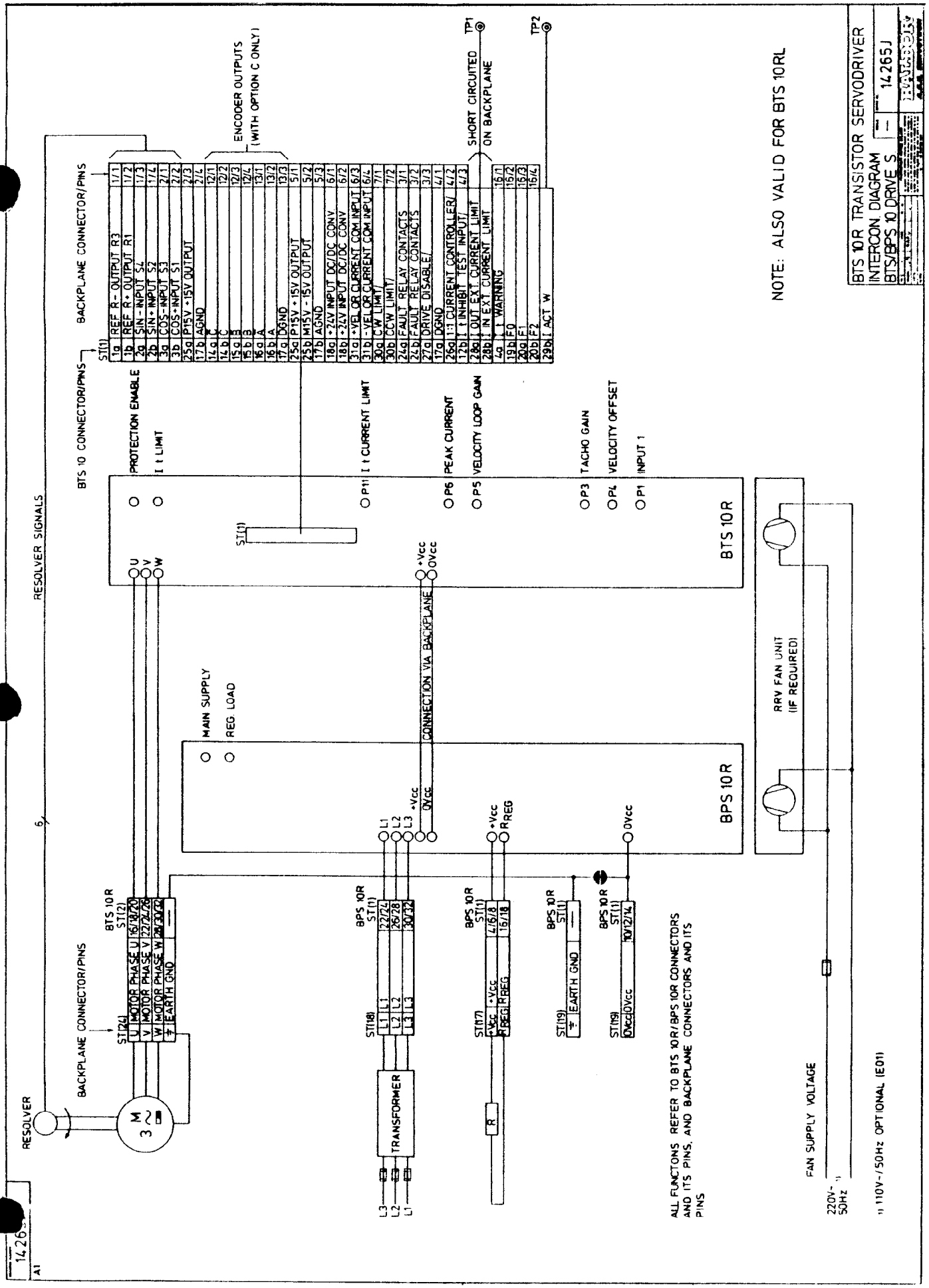


TITLE	BTS 10R/RL MECHANICAL SYSTEM CONFIG.
DRAW NO	16181 C
REV NO	B C
DRAWN	17.11.88 MICEVIC
CHECK	18.1.89 MK
MATERIAL	
TOLERANCES	
SURFACE ROUGHNESS	
PROTECTIVE FINISH	





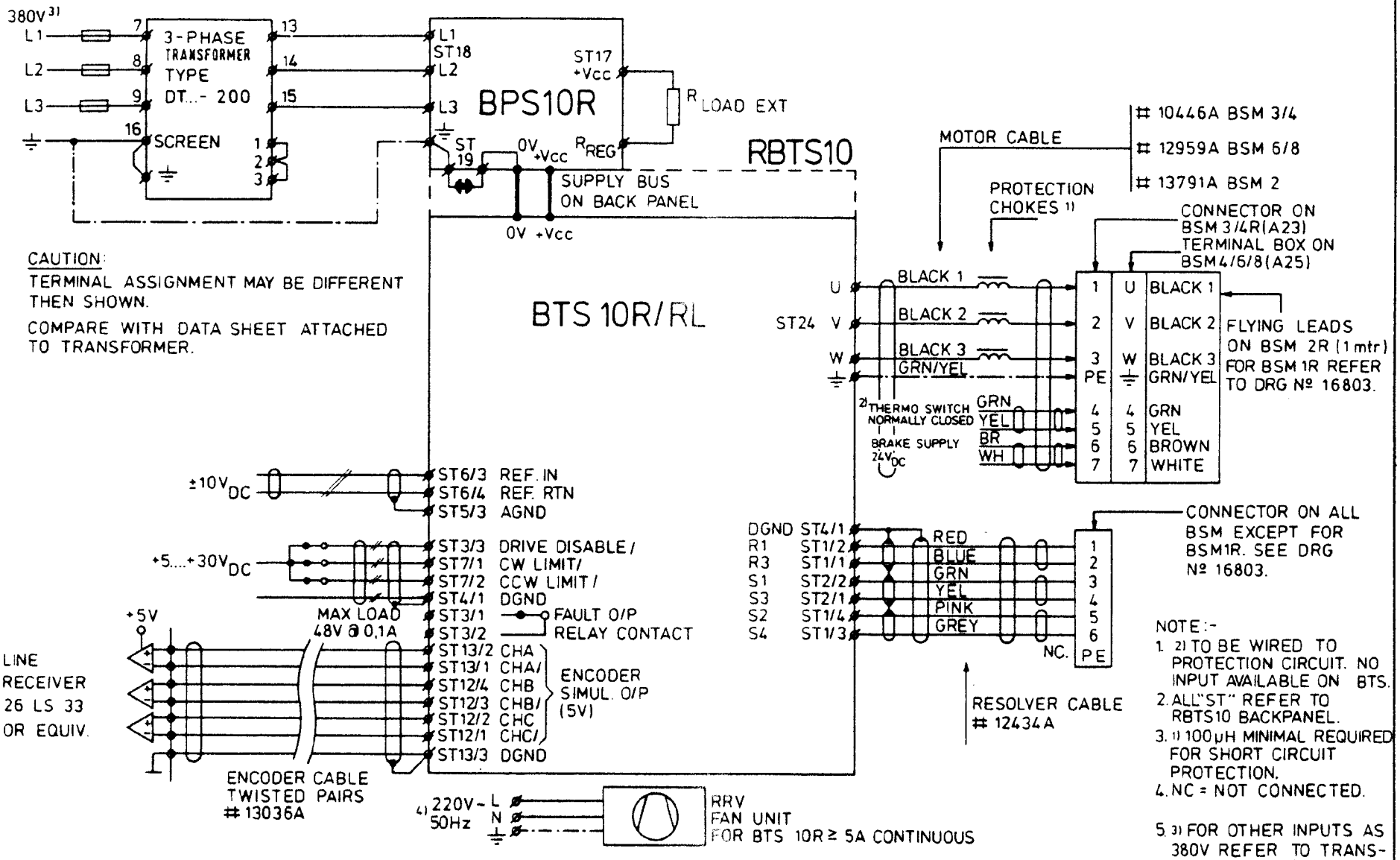
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A3

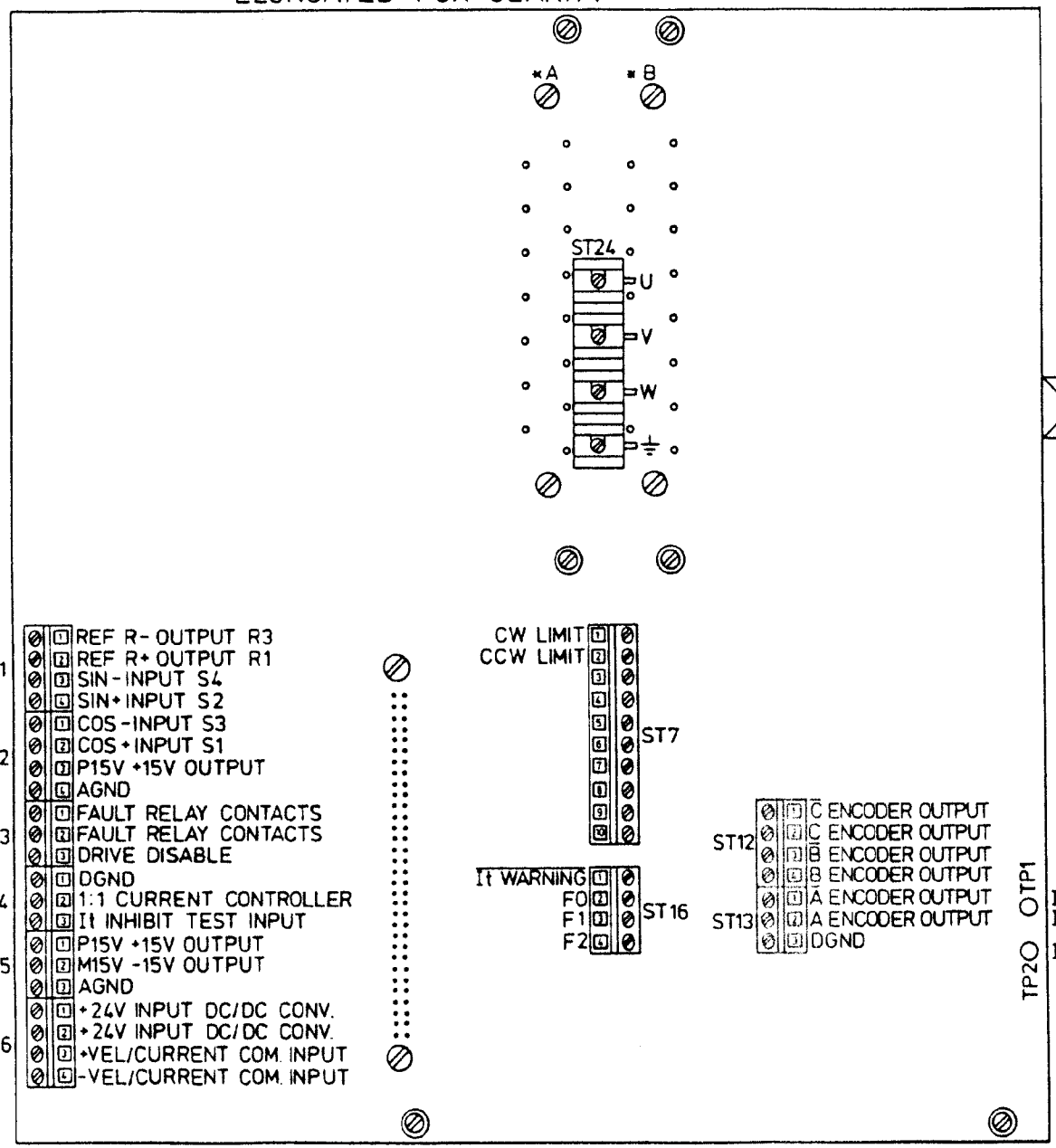


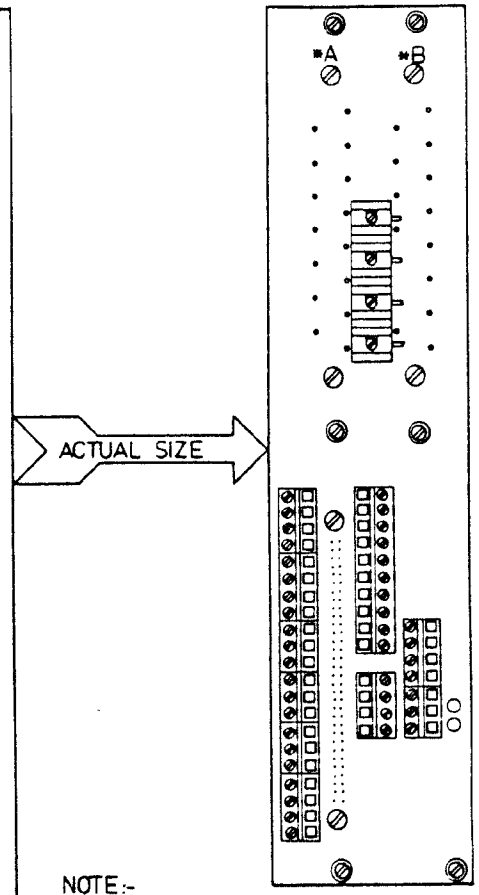
198 9	DATE		REV.-NO	PROPRIETARY NOTICE BALDOR	TOLERANCES	MATERIAL	PROTECTIVE FINISH	TITLE	SCALE	DRAW.-NO.
DRAWN	JUN		D		—	—	—	RBTS 10R/RL CONNECTION DIAGRAM FOR RESOLVER BASED SYSTEM	—	15240E
CHECK			E							
NORM										

BALDOR ASR

14908B

ELONGATED FOR CLARITY





NOTE:-
*A = POWER CONNECTOR FOR BTS10RL VERSION
*B = POWER CONNECTOR FOR BTS10R VERSION

I OUT EXT. CURRENT LIMIT } SHORT CIRCUITED
I IN EXT. CURRENT LIMIT } ON BACKPLANE

I ACT W

BTS10R TRANSISTOR SERVODRIVER RACK BACK PLANE (SINGLE AXIS) PIN DESIGNATION DIAGRAM

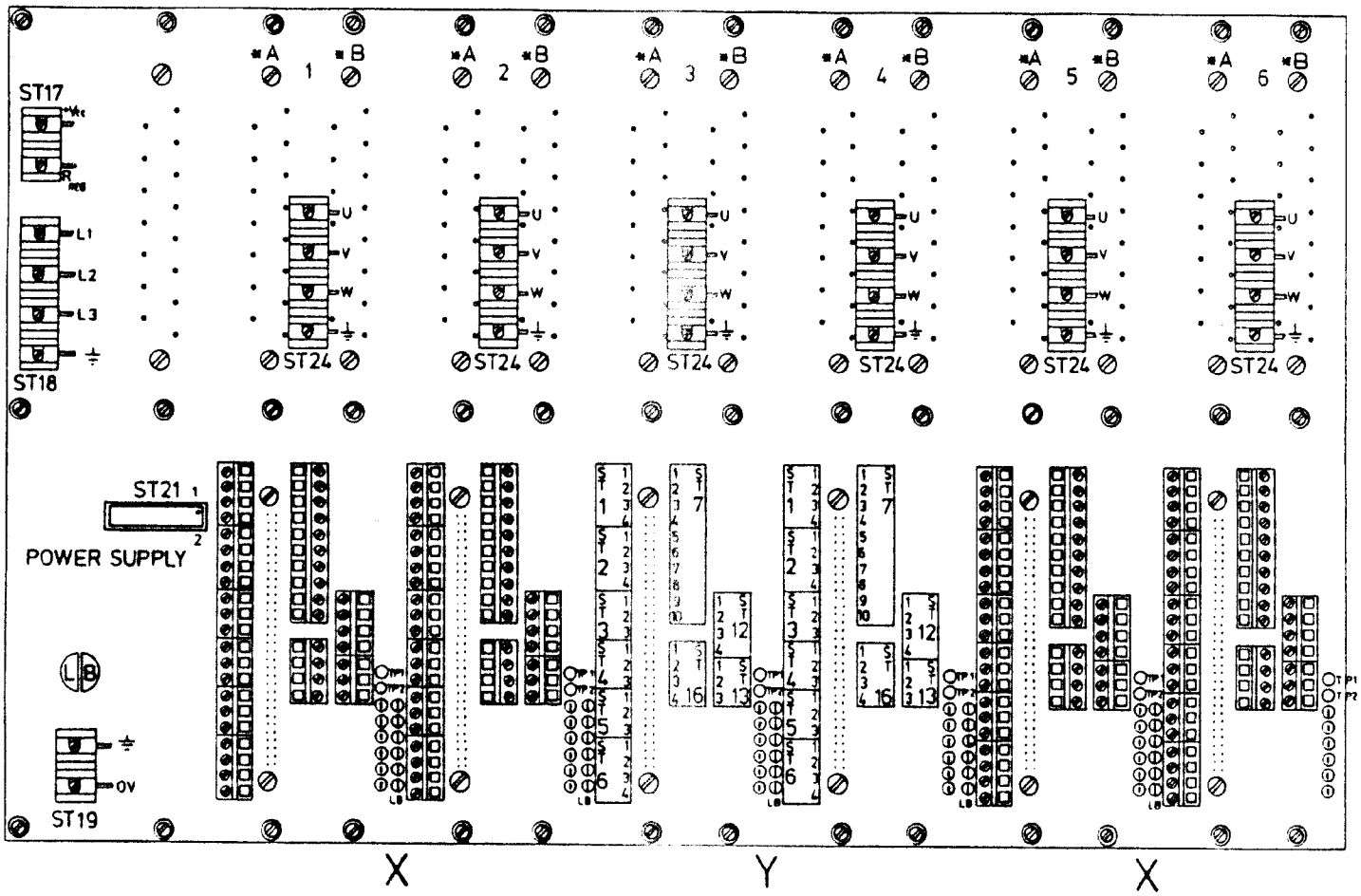
		N.T.S	14908B

BALDOR
A.S.R. SERVOTRON

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

15206C

COMPONENT SIDE VIEW



NOTE:-
*A=POWER CONNECTOR FOR BTS 10RL VERSION
*B=POWER CONNECTOR FOR BTS 10R VERSION
1. HOLES MARKED THUS :-Ⓘ ARE SOLDER STUDS.
2. BOTH X SECTIONS ARE ASSEMBLED AS PER Y SECTION.

BTS 10R/RL RACK BACK PLANE (COMPLETE) ASSEMBLY DRAWING (COMP SIDE)		1:1	15206C
			BALDOR A.S.R. SERVOTRON

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Encoder Output/Pole Pair Select

By means of a 5-way Dip switch it is possible to select the encoder resolution and the number of poles of the connected brushless motor.
The switch is located on the top card or resolvercard (see page 10).

1. Pole Pair Select

Number of pole pairs	S1/1	S1/2	S1/3	Motortype	Option
1	OFF	OFF	OFF	BSM 2 R	B01
2*	ON	OFF	OFF	BSM 1/3/4 R	B02
3	OFF	ON	OFF	BSM 6 R	B03
4	ON	ON	OFF	BSM 4/6/8 F	B04
5	OFF	OFF	ON		
6	ON	OFF	ON	* set ex	
7	OFF	ON	ON	works	
8	ON	ON	ON		

2. Max. Speed Setting

R 38 = 422 kΩ, 1 %, 0,5 W standard for 2000 rpm motors
R 38 = 221 kΩ, 1 %, 0,5 W standard for 4000 rpm motors *
R 38 = 150 kΩ, 1 %, 0,5 W standard for 6000 rpm motors
For location of R 38 see page 10. * fitted ex works

3. Encoder Simulation*[1] (Option C)

Pulses/Rev.	S1/4	S1/5	Option	
1000*	OFF	OFF	C08	* set ex works
500	ON	OFF	C07	
250	OFF	ON	C06	
100	ON	ON	C05	

Note: Other resolutions available on request
*[1] EPROM IC 13 # 15996

4. Velocity or Current Mode

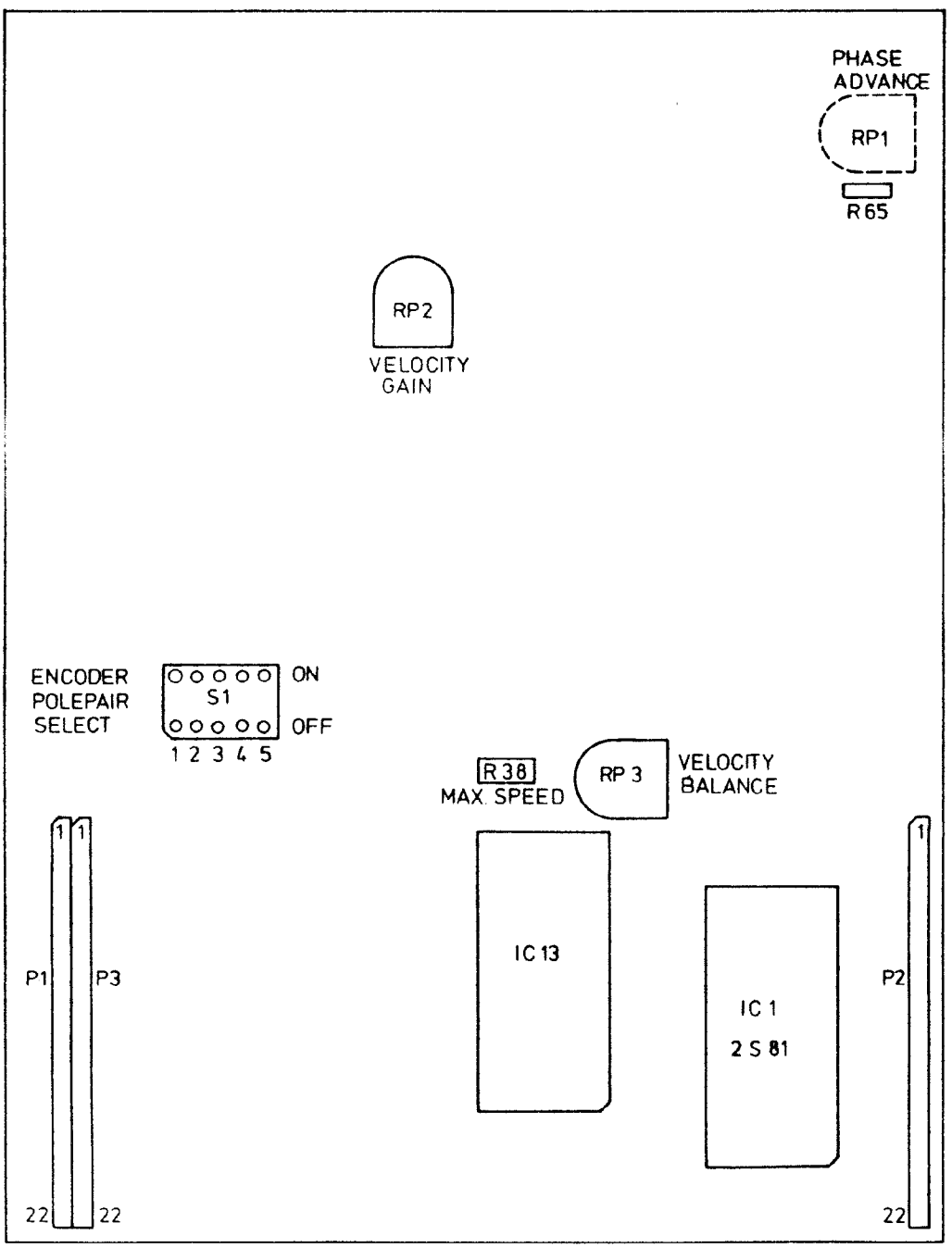
With control input "$\overline{1:1}$" on ST 4/2 it is possible to use the amplifier as velocity controller or current controller.
When taken "low", the velocity feedback is switched out and the input gain is set to unity. With P1 and P6 set fully CW the overall gain is: $G = \frac{I_{pk}}{9,65}$ (A/V).

LB 101 has to be open.

5. Phase Advance

The generated current in each winding lags the current command as a function of shaft velocity. This is due to the current loop bandwidth, limited by the fixed intermediate bus voltage.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



NOTE: ACTUAL COMPONENT PLACEMENT
MAY DIFFER FROM SHOWN
COMPONENT LAYOUT
R38 ON SOLDER POINT
RP2, RP3 SET AT FACTORY
RP1 OPTIONAL

DRAWN	DATE	NAME	REV. NO	PROPRIETARY NOTICE BALDOR	TOLERANCES	MATERIAL	PROTECTIVE FINISH	TITLE	SCALE	DRAW. NO
CHECK	26/7/89	MH						BTS10R-CARD 3 REDUCED COMP. LAYOUT		15473 C
MFG										

BALDOR ASR

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

To produce max. torque per ampere the real current vector (or torque producing) must be in phase with the EMF of the motor. Advancing the phase angle must be performed as a function of motor speed and electrical time constant. R65 located on the resolvercard (see page 10) determines the amount of phase advance. With the standard value (R65 = 26,7 kΩ) the current efficiency is approx. 90 ... 95 %.
For all BSM R/F motors the optimum resistor value is available on request.
Note: Wrong resistor values may lead to speed limiting.

6. Voltage check

The BTS 10 R/RL work on 200 V DC nominal with a maximum working voltage of 240 V DC. The 3-phase transformer should have an AC-output of 140 V nominal or 169 V max. @ no load (starconfiguration line to line voltage).

Note: The voltage check should be made with all amplifiers removed. The AC-supply should be measured without BPS 10 R, the DC-supply with BPS 10 R.

7. Potentiometer Preset

Equip chassis with BTS 10 R/RL amplifiers and BPS 10 R power supply and set the potentiometers as follows:

a) RP 1 (command input) clockwise for max. input gain
b) RP 3 (velocity feedback gain) clockwise for max. gain
c) RP 5 (velocity loop gain) anti-clockwise for min. gain
d) RP 6 (peak current) anti-clockwise for reduced current

8. Speed Adjust

a) Remove command signal lines and short circuit input (ST 6/3 and ST 6/4)
b) Power on. Turn RP6 slowly clockwise until motor develops torque. If no torque - check CW/CCW limit and total disable inputs. If motor shaft accelerates - check resolver wiring.
c) Adjust RP4 (velocity offset) until motor comes to a complete rest.
d) Connect command signal and adjust speed with RP 1 and RP3 as necessary in your application.
e) Check offset again.

9. Response Optimization

The step response can be optimized with the velocity loop gain potentiometer RP5.
In order to achieve proper adjustment it is necessary to observe the current waveform on TP5 with an oscilloscope. RP5 is adjusted properly when the current waveform shows a single overshoot on applying a step command. At constant velocity the AC-component on TP5 should be kept as low as possible but should not exceed 2 Vpp in order to avoid excessive motorheating.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

POTENTIOMETERS ON BTS 10 R/RL

For location of potentiometers on BTS 10 R see page 16, drawing no. 14642. For location of potentiometers on BTS 10 RL see page 17, drawing no. 17903.

RP1 - Input gain
velocity or current
fully CW ≙ unity gain.

RP4 - Velocity offset adjust
zero speed adjust for zero command

RP3 - Velocity feedback gain
has to be adjusted to reference speed.
Fully CW ≙ max. gain.

RP5 - Velocity loop gain adjust
adjusts the frequency response of the velocity controlloop.

Turning RP5 clockwise results in an increasing high frequency gain with possibly negative effects (motor-heating). It is extremely important to observe TP5 with an oscilloscope when adjusting RP5.
For most applications there is no need to increase the AC-gain and RP5 is set to fully CCW.

RP6 - Peak current adjust
sets peak current level which can be measured on TP5.
Fully CW ≙ max. I_{pk}

RP11 - It current limit adjust
sets current limit level.
Fully CW ≙ I nominal.

Note: RP1, RP3, RP5, RP6 and RP11 can be substituted by fixed resistors on headers J2 and J3.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BTS 10 R/RL - TESTPOINTS

To allow effective set-up of the amplifier and its controlloop several testpoints are accessible on the front side as well as on the backpanel (BTS 10 R - see page 16; BTS 10 RL - see page 17). Since most signals have alternating waveform it is recommended to use an oscilloscope for measuring purposes.
All signals are related to TP8 (GND).

Caution: To avoid ground loops and interference it is strongly advised to isolate the measuring equipment from neutral (earth).

TP9: PWM signal
20 Vpp, 10,5 kHz triangle
(for test purposes only)

TP1: Actual rms current phase U
$I_{pk} \hat{=} 10,0$ V

TP2: Actual rms current phase V
$I_{pk} \hat{=} 10,0$ V

TP3: Actual rms current phase W
$I_{pk} \hat{=} 10,0$ V

Note: For torque calculations referring to the actual current the formula is:

$$T = 3\ KT\ \frac{V\ TP \cdot I_{pk}}{10,0}$$ (for rotating motorshaft only)

where T = Motortorque (Nm)

KT = Torque constant per phase (Nm/A)

V TP = Voltage on TP 1, 2 or 3

I_{pk} = peak rms current rating of amplifier BTS 10 R/RL ($I_{pk} \hat{=} 2 \cdot I$ nom.)

TP5: $I_{command}$
This is the output signal of the velocity controlloop 9,25 V max. $\hat{=}$ amplifier's peak current.
The voltage level is proportional to rms output current.
TP5 is the major testpoint to look at during set-up. The voltage level can be easily converted to accel/decel torque or friction by using the motor torque constant.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The signal waveform is DC with a superimposed alternating component. As a general rule, current saturation should be avoided at all times in position controls.
The AC component must be kept as low as possible since this leads to heatdissipation in the motor (see potentiometer RP5).

Note: On BTS 10 R, TP 5 shows the current command before It limiting. Be sure, that It limit is off - otherwise current-reading will be false.

TP6: Velocity command signal (or current command when 1:1 input on ST 4/2 taken low) shows input signal after attenuator RP1

TP7: Actual velocity
This signal is derived from the resolver to digital converter and is used as velocity feedback. Standard output 2,5 V/krpm (R38 = 221 kΩ) for 4000 rpm motors.
For 6000 rpm motors R38 = 150 kΩ and V TP7 = 1,33 V/krpm,
for 2000 rpm motors R38 = 422 kΩ and V TP7 = 5,0 V/krpm.

Accuracy: ± 5 %
Ripple: typ. 1 % @ 10 V
Offset: ± 150 mV max.

Note: To avoid RDC saturation, the voltage level at TP7 should not exceed ± 10,0 V.

Testpoints on backpanel:

TP1: $I_{command}$, ± 9,65 V ≙ I_{peak} rms (see also TP5)

TP2: see TP3

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

IDENTITY HEADERS J2 AND J3

On the Identity Headers all important potentiometers can be substituted by fixed resistors (see page 16 for BTS 10 R; see page 17 for BTS 10 RL).
Also the frequency response components for the velocity and current loop are located here.

Header J2

For the velocity loop and its variable components on J2 please refer to the drawings on pages 16 and 20 for BTS 10 R and on pages 17 and 21 for BTS 10 RL.

Notes:

1. R 103 avoids setting of RP1 (RP1 set to fully CW)

2. R 101 avoids setting of RP3 (RP3 set to fully CW)

3. RP5 = 20 kΩ

4. RP6 = 20 kΩ

5. Standard values: R101, R103 = 22,1 kΩ
   R93 = 332 Ω, R94 = 332 kΩ, C19 = 47 nF

Header J3

Here are the PI components for the current loops of phase U and phase V.

Proportional gain = R43 and R44 (150 kΩ, 100 kΩ on RL)

Integral gain = C17 and C11 (4,7 nF)

Note: For most applications the standard values will give good performance of the current loop.
Its functioning can be verified on TP1 through TP3:
The current waveform should be smooth and not have excessive 10,5 kHz (PWM) components.

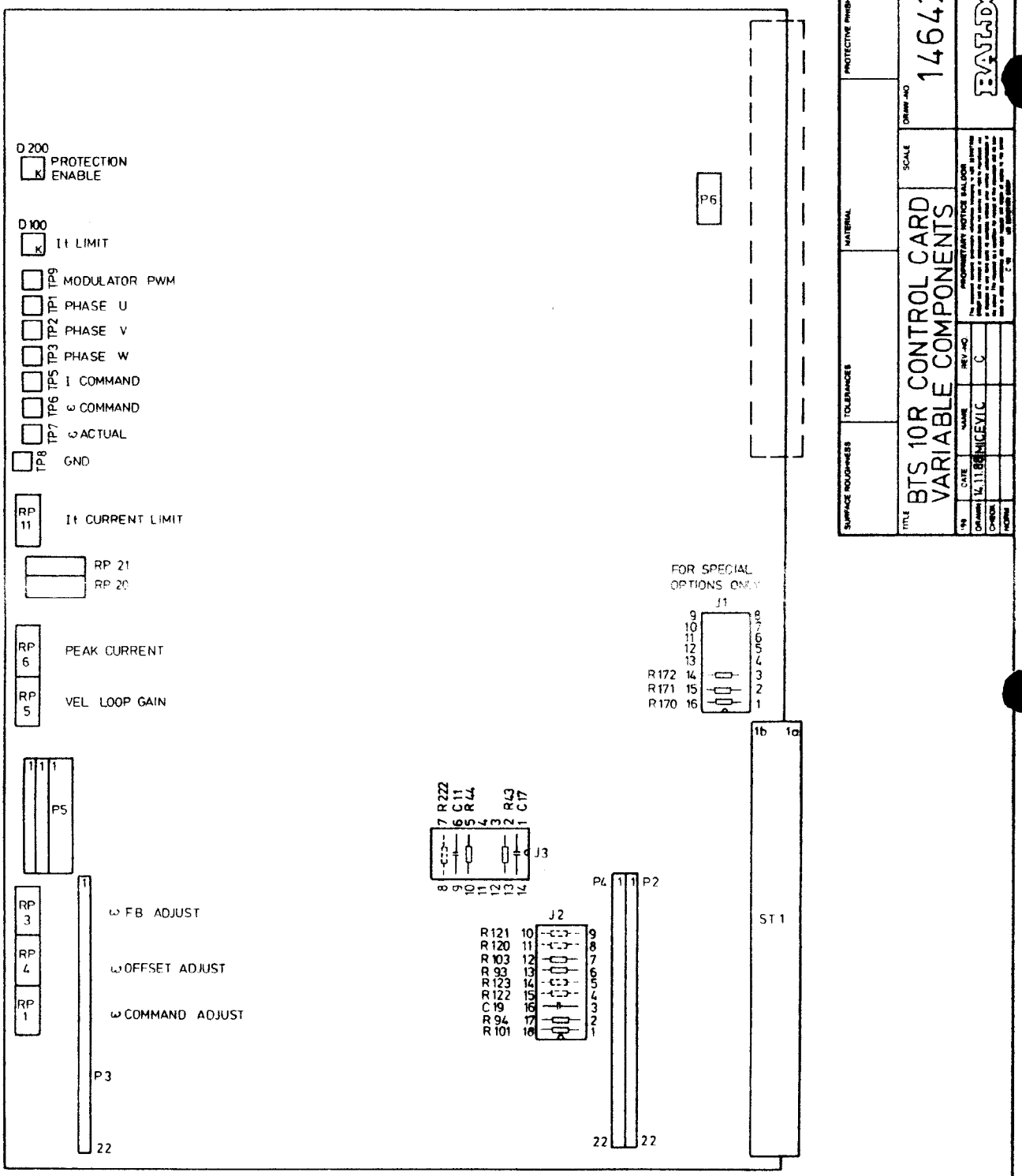
The substitution of RP 11 - It limit is R 222.
On BTS 10 R, R 222 is located on header J3; on BTS 10 RL, R 222 is located near J3.

It limit = R 222 (with RP11 removed)

$$I_{limited} = \frac{R\ 222}{R\ 222 + 20\ k} \cdot I_{pk}$$ (R222 = 20 kΩ max.)

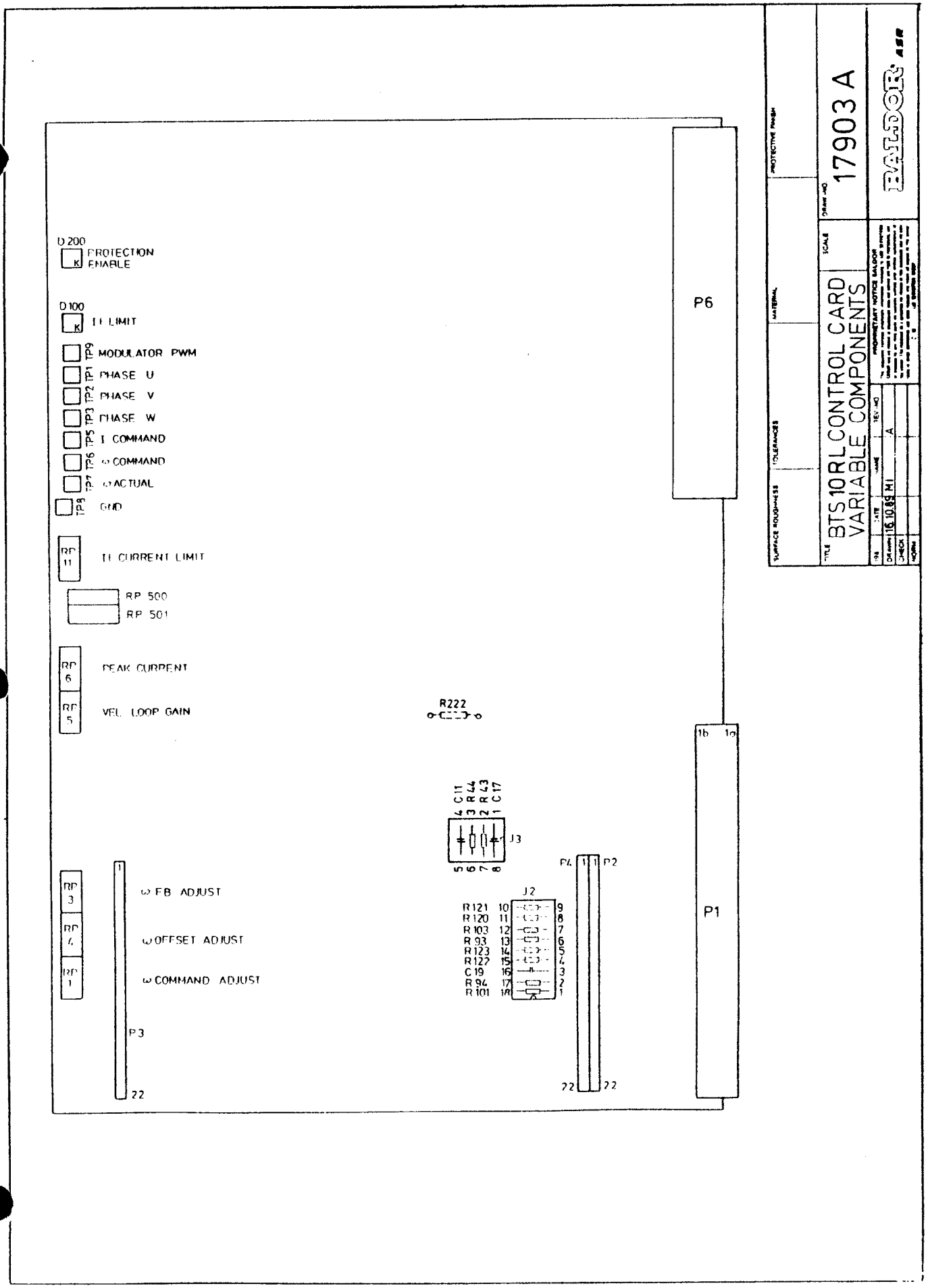
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

LOCATION OF TESTPOINTS, POTENTIOMETERS AND COMPONENT HEADERS ON BTS 10 R CONTROL CARD



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

LOCATION OF TESTPOINTS, POTENTIOMETERS AND COMPONENT HEADERS ON BTS 10 RL CONTROL CARD



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BTS 10 R/RL - I/O HARDWARE AND FUNCTION

INPUTS

Velocity or current
differential Input
V in max. = ± 10 V_{DC}

CW Limit
high = enable
V in max. = + 5 ... + 30 V_{DC}

CCW Limit
high = enable
V in max. = + 5 ... + 30 V_{DC}

Note: CW/CCW Limits
disable amplifier, no
active braking.

Drive Disable
high = enable
V in max. = + 5 ... + 30 V_{DC}

$\overline{1 : 1}$ Current control,
active low.
Sets velocity loop gain
to unity and velocity
(tacho) feedback to zero
for use of current
amplifier only.

Resolver Sine S 4

Resolver Sine S 2

Resolver Cosine S 3
Resolver Cosine S 1
Signal waveform sinusoidal
7,2 kHz, 10 Vpp

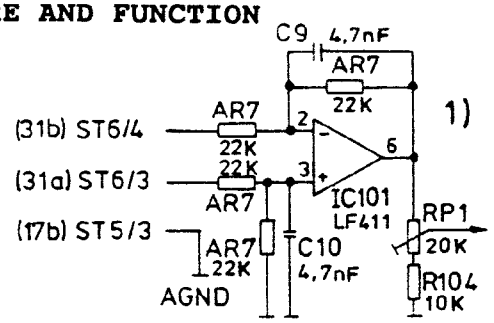
It Inhibit Test

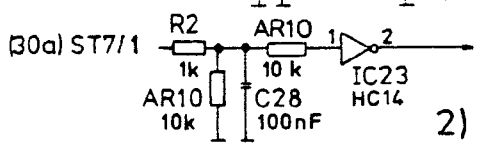
Note: For test purposes only,
low disables electronic fusing.

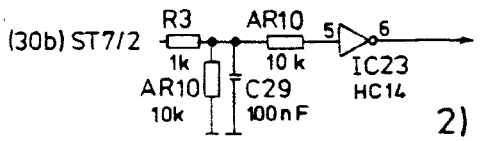
+ 24 V_{DC} Input for Control
logic supply (optional)

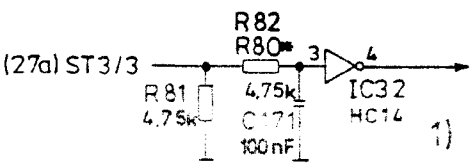
Inputrange + 18 ... + 60 V_{DC}

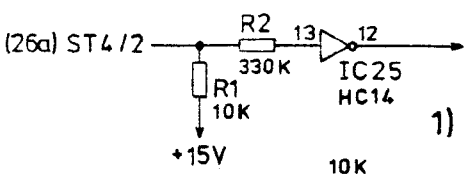
Inputpower 40 W

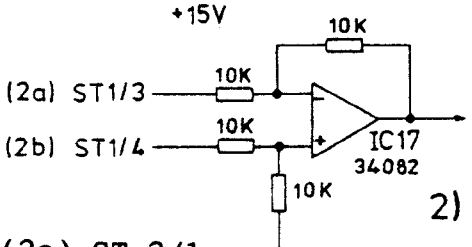




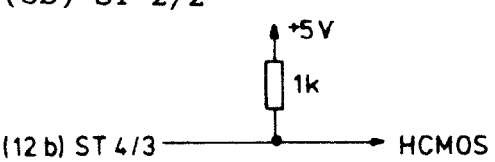


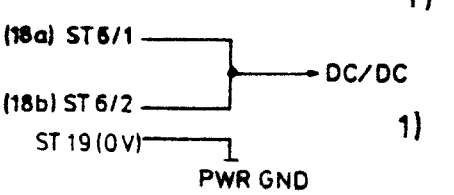






(3a) ST 2/1
(3b) ST 2/2 *** above



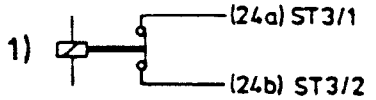


1) On Control Card
2) On Resolver Card
*) For BTS 10 RL

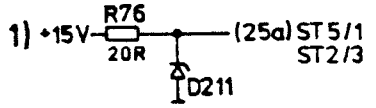
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BTS 10 R/RL - I/O HARDWARE AND FUNCTION

OUTPUTS



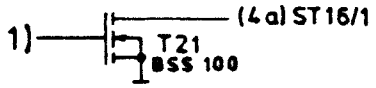
Fault relay contacts, open when fault.
max. load: 48 V_{DC} @ 100 mA



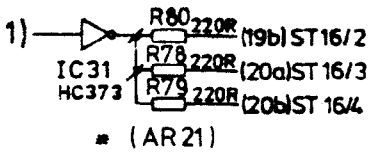
+ 15 V @ 20 mA



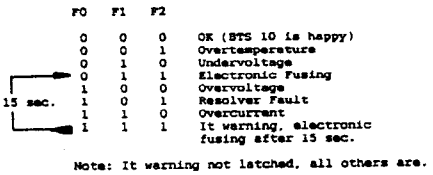
- 15 V @ 20 mA

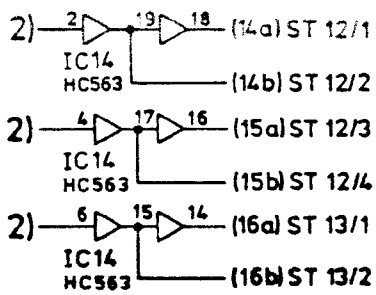


It warning
max. load + 30 V @ 50 mA
active low



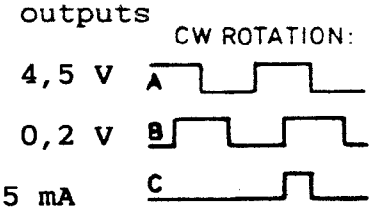
F0
F1
F2
Error code
5 V output

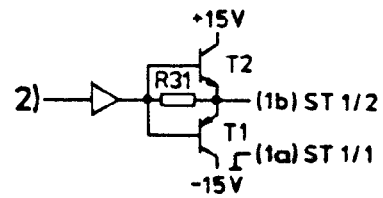




CHC /
CHC
CHB /
CHB
CHA /
CHA

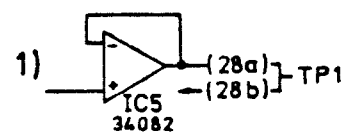
Encoder outputs
$V_{OH} \geq +4,5$ V
$V_{OL} \leq +0,2$ V
$I_{OUT} \leq 5$ mA
Not short circuit proof



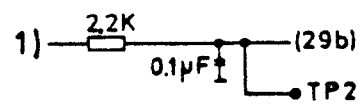


Resolver Reference R 3
Resolver Reference R 1

Signal waveform sinusoidal 7,2 kHz, 21 Vpp



Current command signal
9,65 $V_{DC} \hat{=} I_{pk}$
load ≥ 10 kΩ



Phase current
I_w actual
10,0 V $\hat{=} I_{pk}$

Note: TP 1 and TP 2 on backpanel.

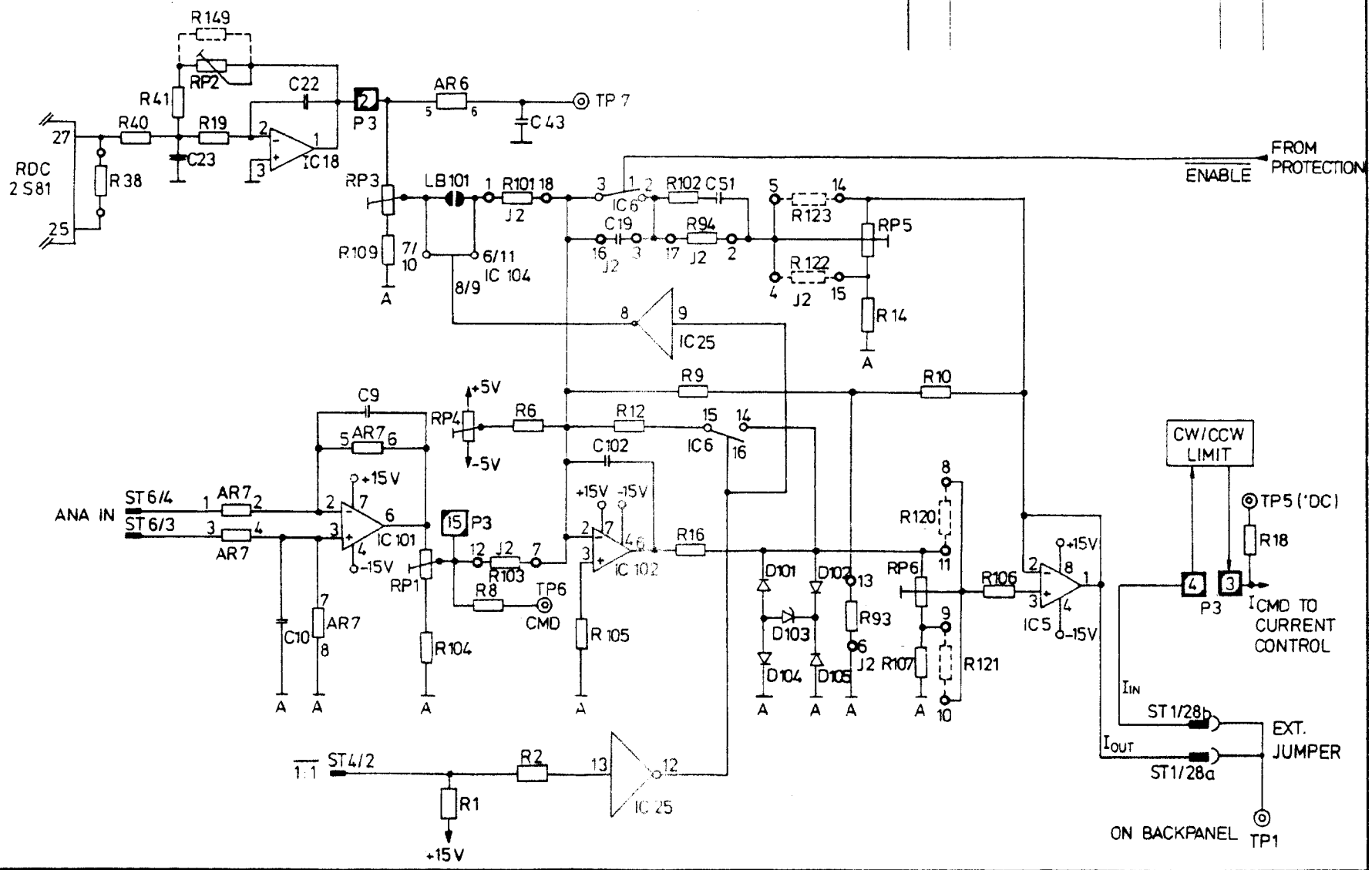
1) On Control Card
2) On Resolver Card
*) For BTS 10 RL

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

DRAWING NUMBER 15274C

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



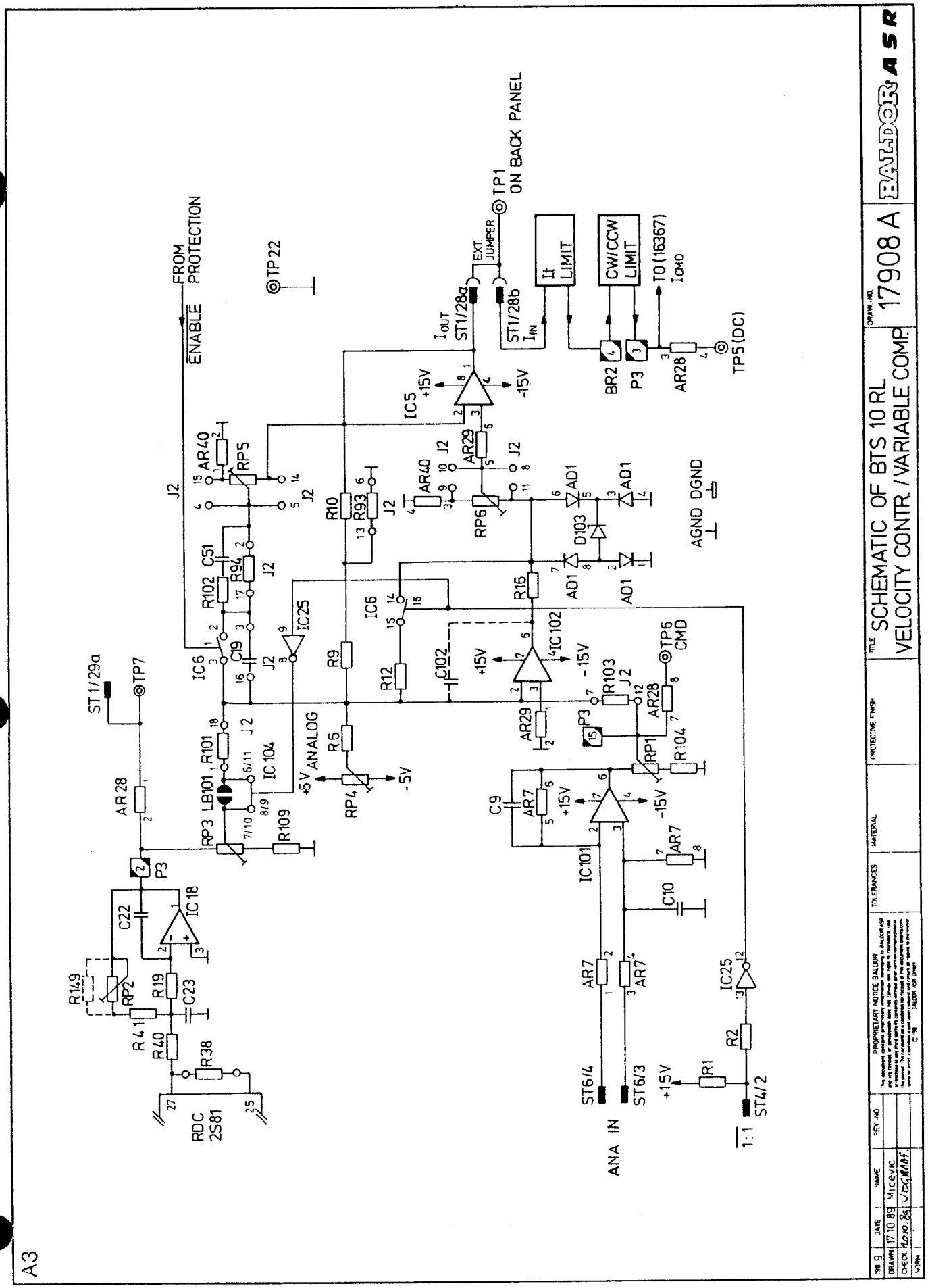
TITLE: SCHEMATIC OF BTS 10 R VELOCITY CONTROL WITH VARIABLE COMPONENTS

ASR SERVOTRON

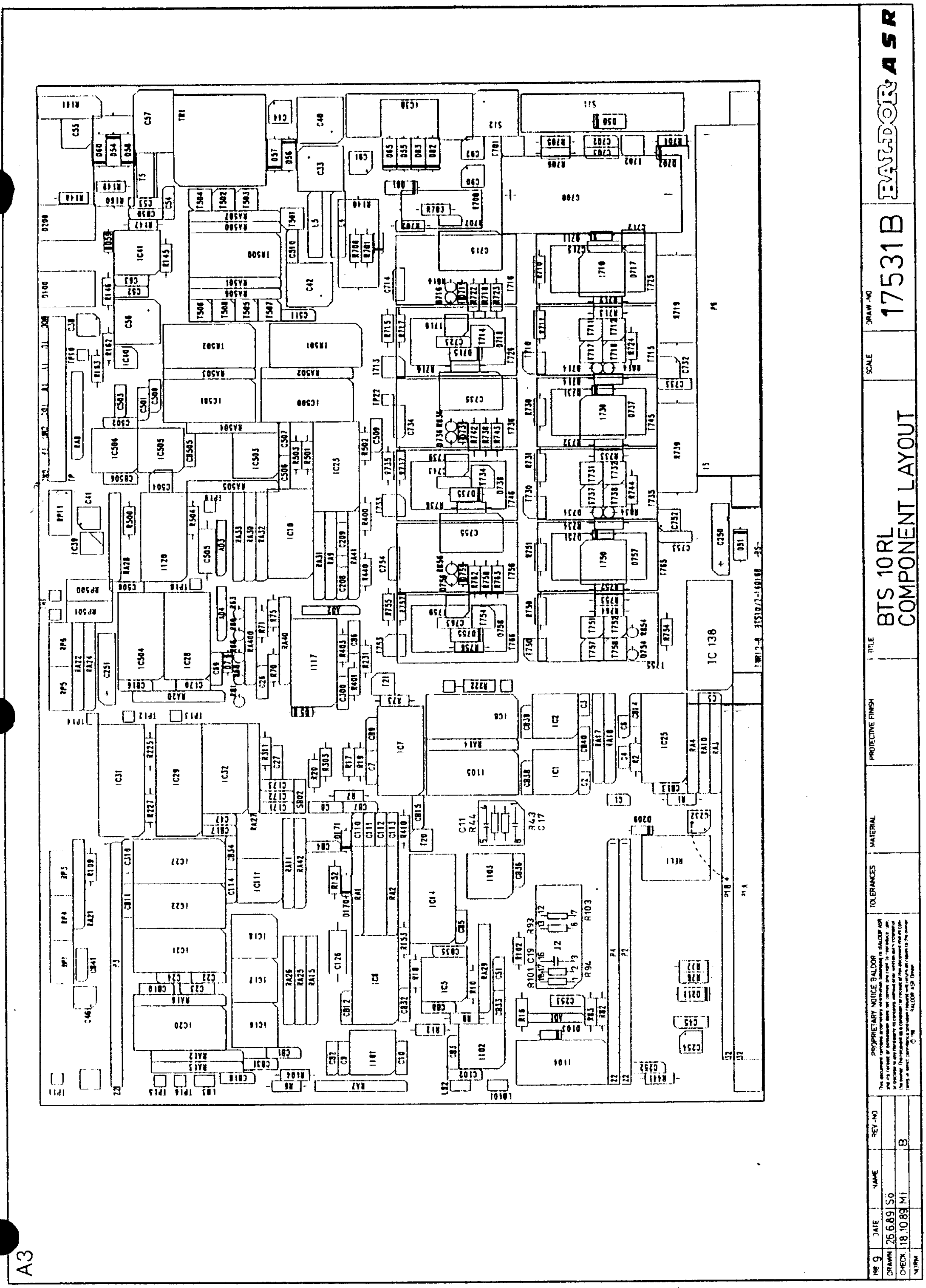
PROPRIETARY NOTICE

REF DRAWING NO

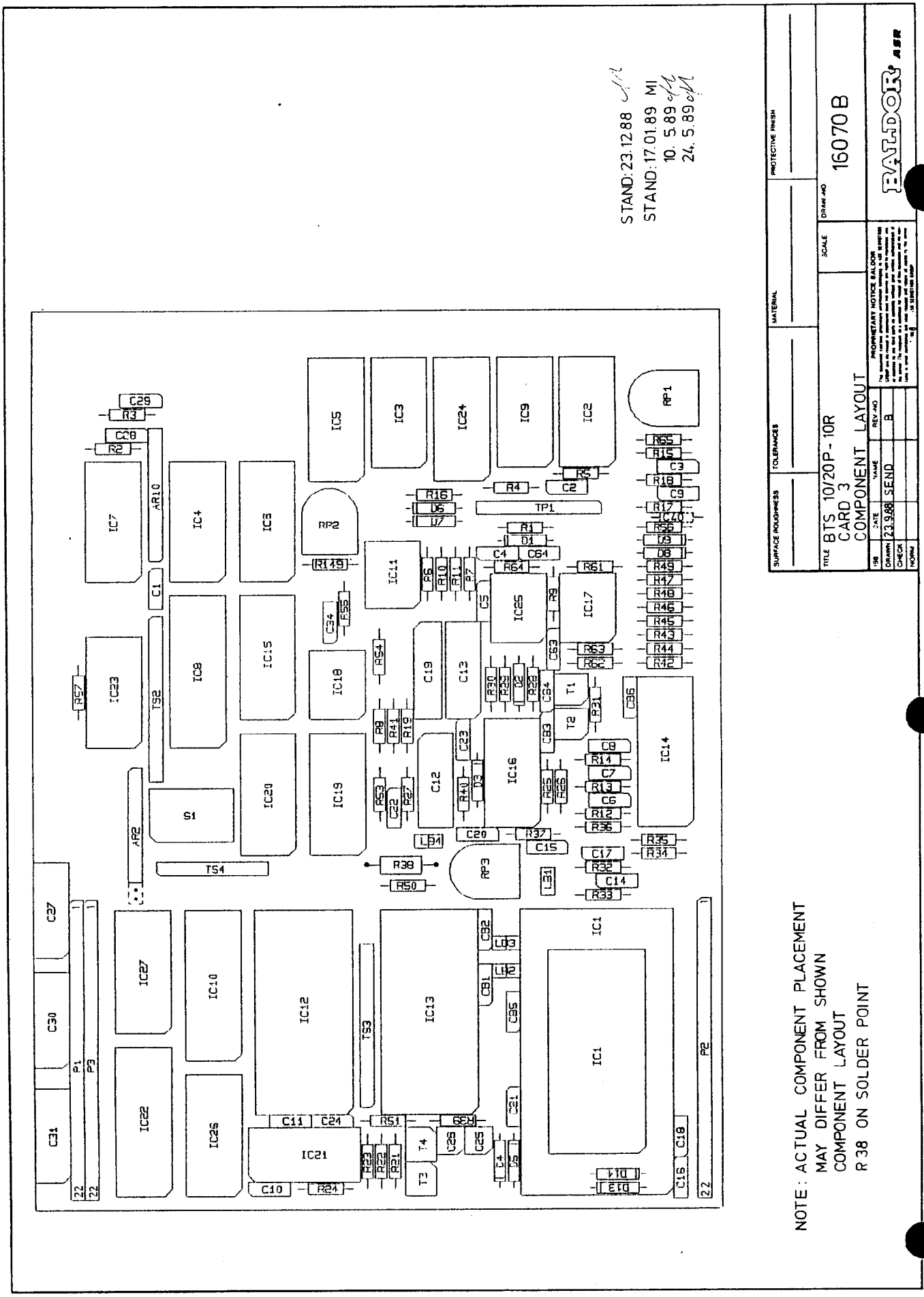
DRAWING NUMBER 15274 C



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

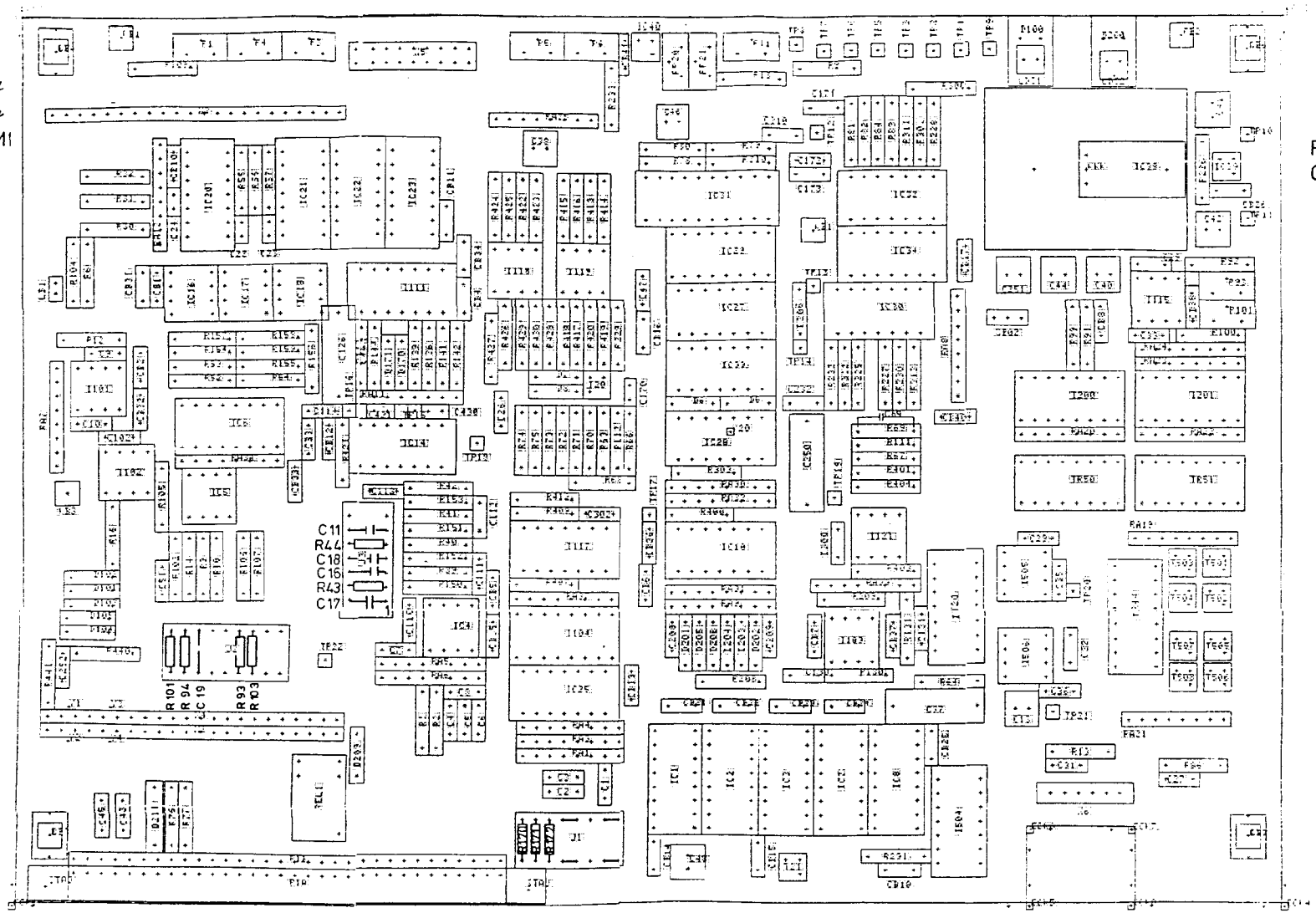


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

STAND: 17.5.88 fe
5.7.88 fe
29.9.88 MI





P5 SOLDER SIDE

FOR TR 44,50,51
CUT PINS 1MM
SHORTER

SURFACE ROUGHNESS	TOLERANCES	MATERIAL	PROTECTIVE FINISH

TITLE BTS 10/1
CONTROL CARD
COMPONENT LAYOUT

SCALE

DRAW.-NO. 13809 C

1988	DATE	NAME	REV.-NO.
DRAWN	22.04.	HARTMANN	
CHECK			

PROPRIETARY NOTICE BALDOR

BALDOR ASR

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BPS 10-200-R

POWER SUPPLY FOR BTS 10 R/RL SERIES AMPLIFIERS

Together with an external 3-phase isolation-transformer the BPS 10 R represents the 200 V DC power-supply.
Its function besides fullwave rectification and filtering also includes a power shunt or regeneration.
The regeneration circuitry limits the DC-Bus voltage level during deceleration of the motor with its load thus preventing an over-voltage shut down on the BTS 10 R/RL.
On the frontplate there are two indicators, one for the 200 V DC supply, the other for the activity of the regeneration.

Input for 200 V DC output: 3 x 140 V AC nominal

Regeneration level: 275 V DC (P1 set and sealed ex works)

Loadresistors:

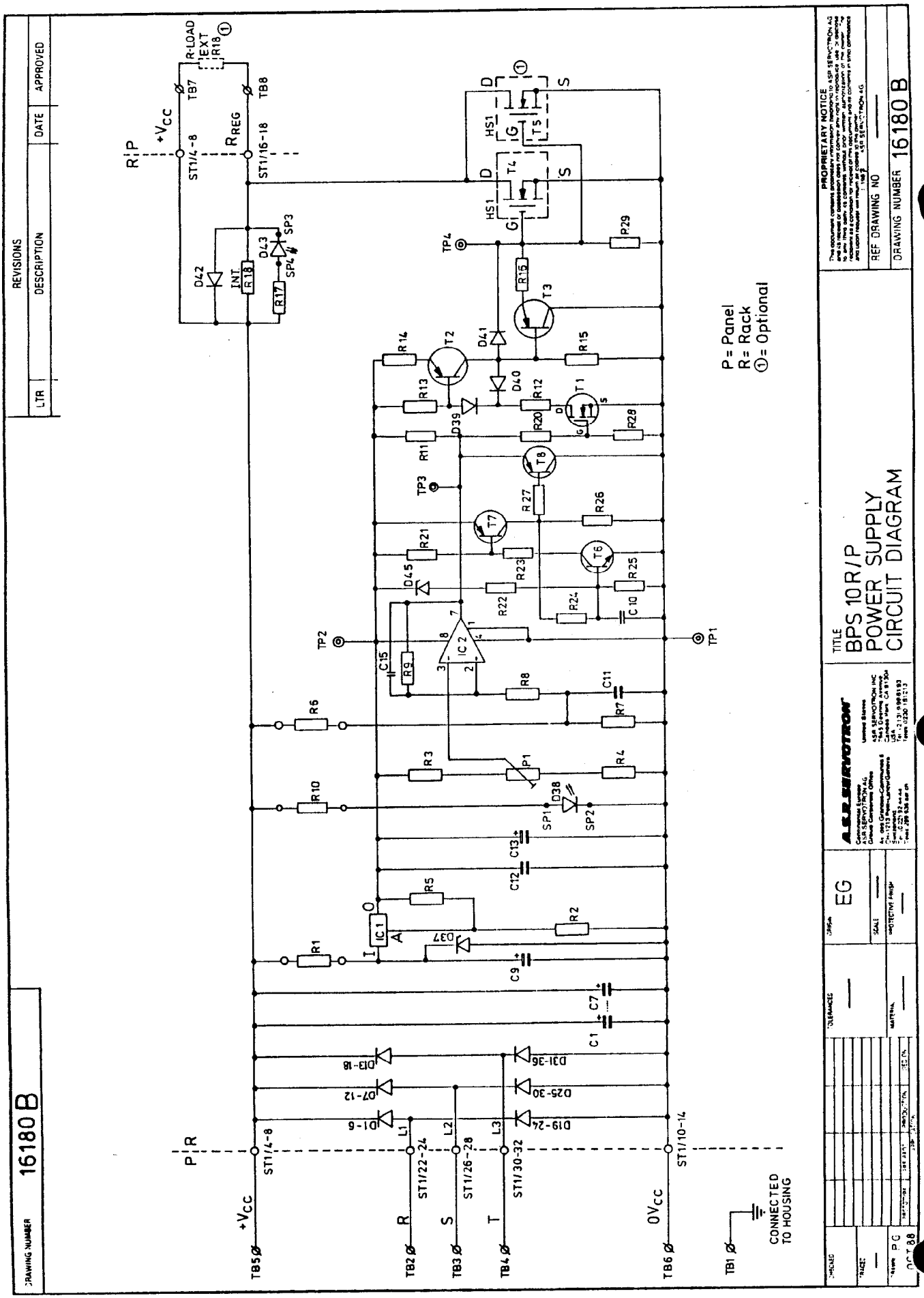
For all BPS 10 R versions an internal loadresistor with 80 W continuous powerrating is included. The peak power dissipation should not exceed 4 kW for time intervals shorter than 1 sec.

For applications where higher powerratings are needed an external resistor may be connected to ST 17 (+ Vcc/R REG), in this case the internal resistor (R18) has to be removed.

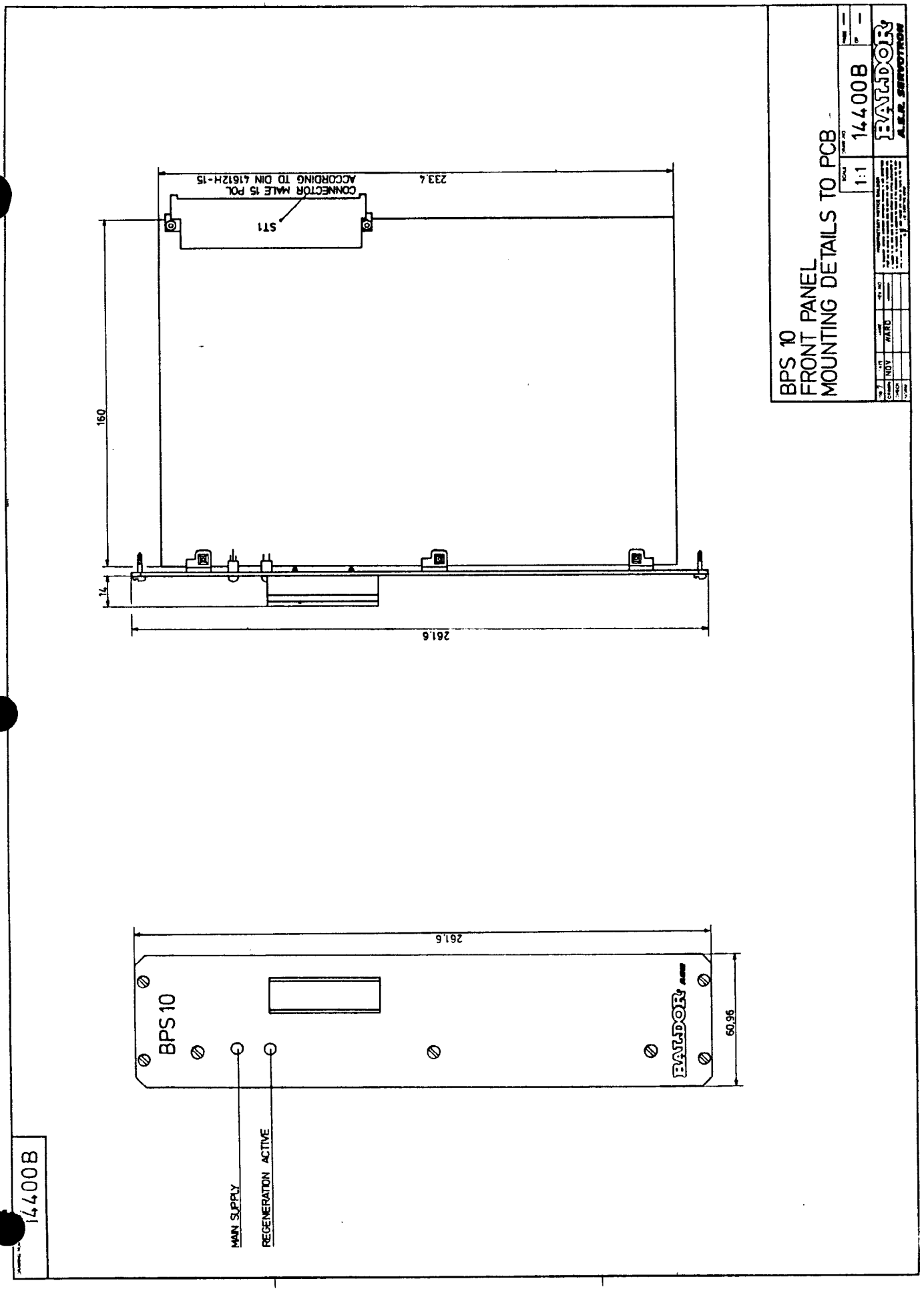
External resistors are available with 320 W powerrating (16 kW @ ≤ 1 sec).

Note: The switching current (20 A) may not be increased, hence the resistor value must be ≥ 14 Ω.

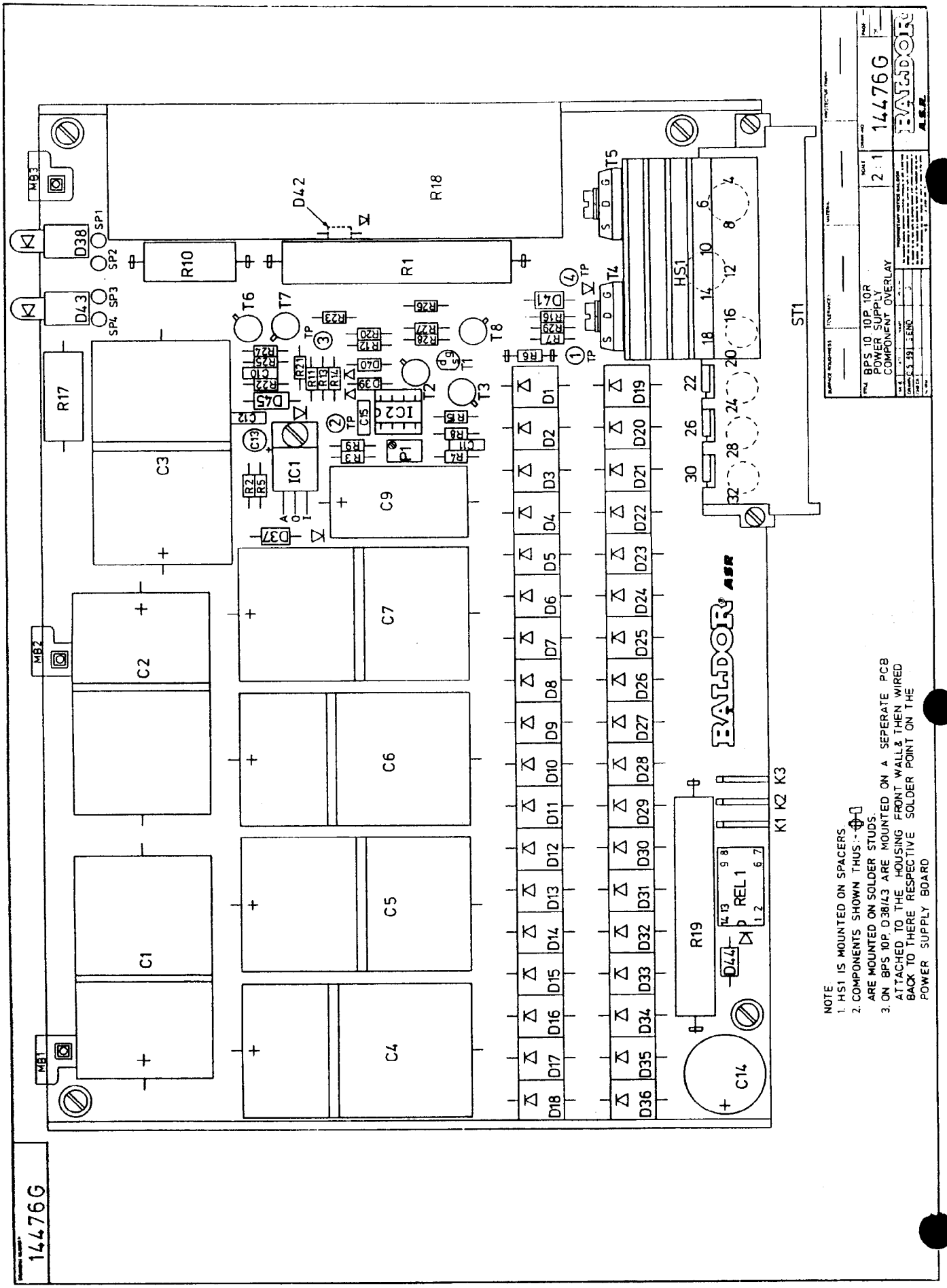
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

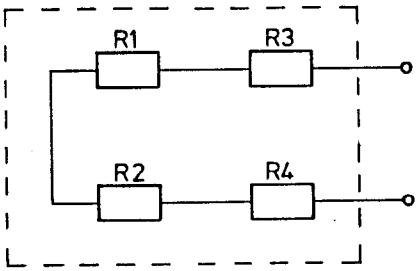


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BPS 10 R-EXTERNAL LOAD RESISTOR



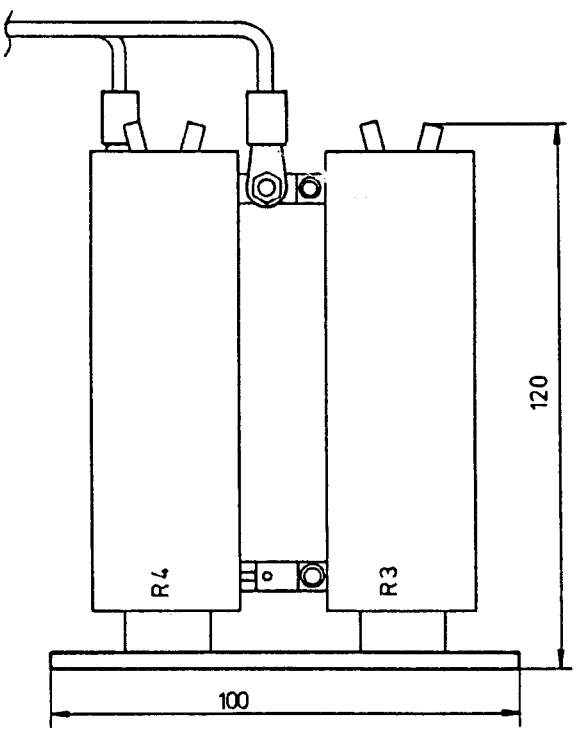
To
ST 17
+ Vcc

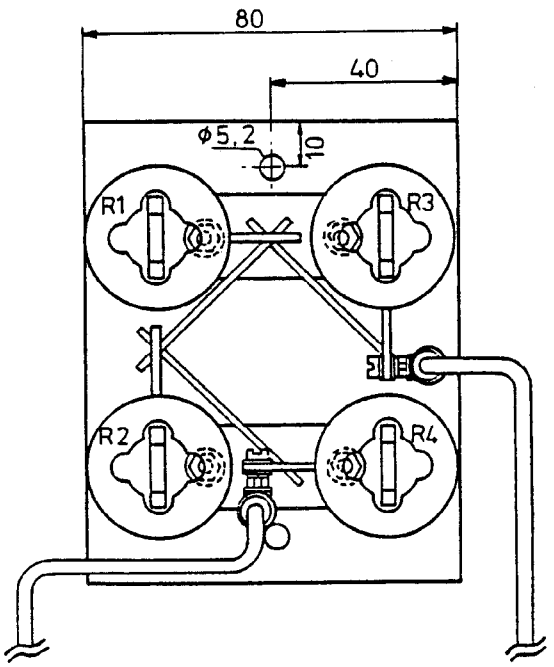
15,6 Ω
320 W

R_{REG}

R 1...4 = 3,9 Ω/80 W
I_{SWITCH} = 17,5 A
14352A

ASSEMBLY DRAWING AND DIMENSIONS



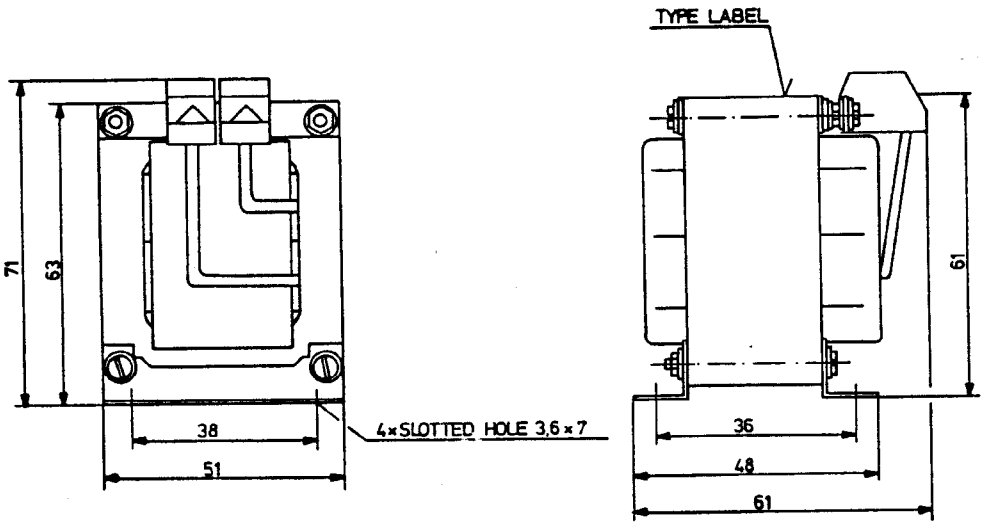


Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

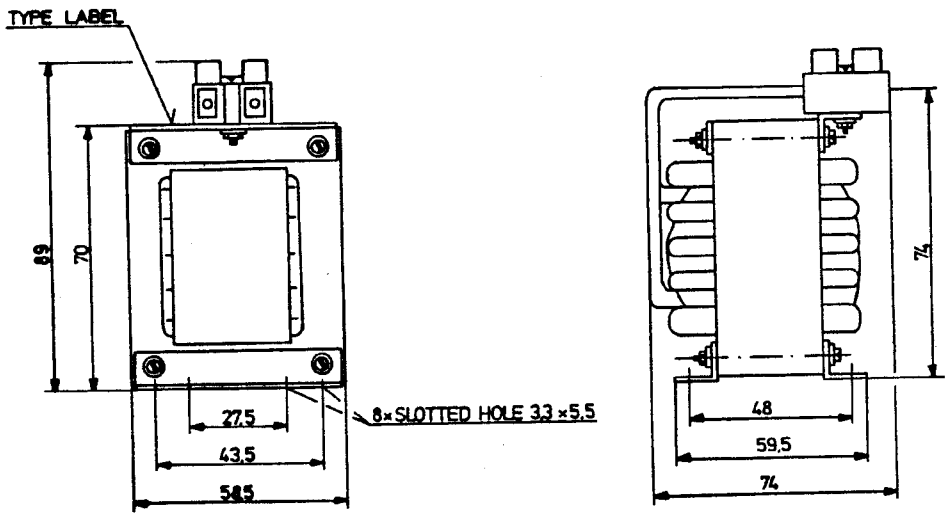
BTS 10 R/RL - PROTECTION CHOKES

The following chokes are available to protect the amplifier against shorts between the outputs and to ground. One choke in each of the three phases to the motor is needed for full protection.

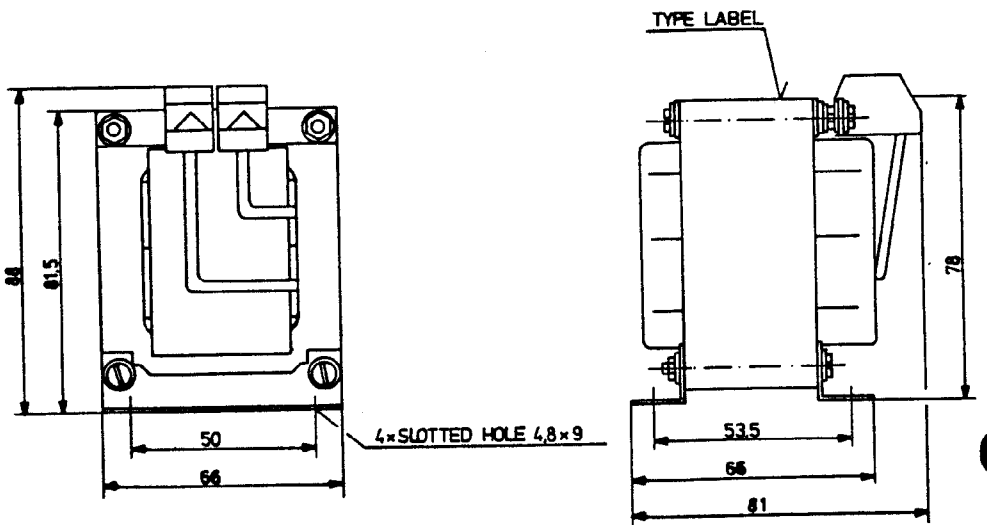
L 100-6
15528A
1 mH/6 A



L 040-15
12956A
400 µH/15 A



L 040-20
15527A
400 µH/20 A



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

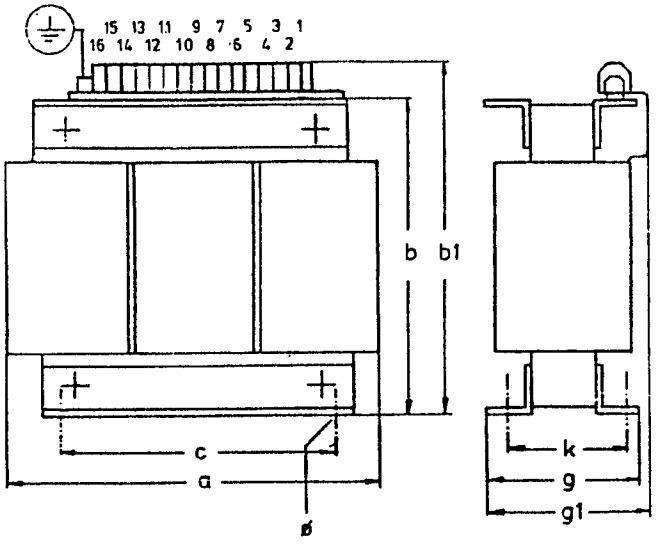
DRAWING NUMBER 160 76 B

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

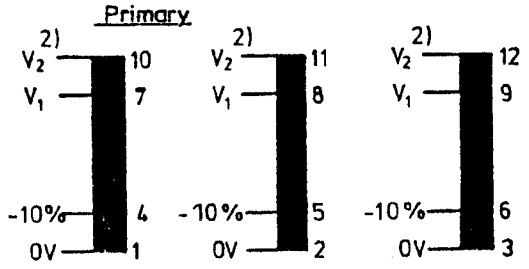
Designation:

DT-010-200-380/-10%/...

- 1st primary 380V standard others on request
- 2nd primary optional
- DC Voltage
- x 100 = P[VA]



TYPE	a_{max}	b_{max}	$b1_{max}$	c	g_{max}	$g1_{max}$	k	ø	kg_{max}
DT 010-200	210	185	241	140	115	135	95	8,8	15
DT 025-200	264	230	285	200	120	150	90	10	27
DT 050-200	300	260	315	224	147	177	119	10	44
DT 075-200	360	310	372	264	158	193	140	10	66
DT 100-200	360	310	372	264	173	208	155	10	76
DT 150-200	420	360	422	316	203	235	173	12	116
DT 200-200	480	380	445	380	232	280	172	13	117
DT 250-200	480	380	445	380	232	280	172	13	126
DT 300-200	510	430	515	380	239	280	179	13	150



Wiring:

1st primary V_1 ,380V Standard

R = 7 1
S = 8 2 } 1)
T = 9 3

2nd primary V_2

R = 10 1
S = 11 2 } 1)
T = 12 3

Sec. (Star)

U 13
V 14 } 143 V @ no load
W 15

Screen
16

Notes:
1) Instead of 1+2+3, 4+5+6 may be jumpered to obtain 10% higher secondary.
2) Optional on request.

CHECKED 23-9-88		RELEASED	ORIGIN	BALDOR ASR SERVOTRON AG	TITLE THREE PHASE TRANSFORMER FOR B P S 10
RACED Mi			SCALE		PROPRIETARY NOTICE
DRAWN 15.09.88		MATERIAL	PROTECTIVE FINISH		REF DRAWING NO
					DRAWING NUMBER 160 76 B

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

USER NOTES

1. 24 V-Option

The Control Supplies are normally generated from the 200 V_{DC} - BUS supply.
For some applications it is necessary to keep the control electronics on stand-by (ex. position information).
This can be achieved by using a supplementary external 24 V supply. In this case the internal supplies will be generated from the 24 V.
Consequently the BUS supply can be varied in a wide range from 0 to nominal.
This feature is not standard and cannot be fitted in the field.

2. S-Option

With a few changes it is possible to upgrade the BTS 10 R/RL to a S-BTS 10 R/RL.

- Remove resolver card.
- Remove frontplate.
- Cut out pin 12 of connector P4.
- Insert µSMCC (S-Option).
- Install S-BTS 10 R/RL frontplate (available as spare part).

3. Current Offset Adjust (BTS 10 R only)

The current offsets are adjusted ex factory at an ambient temperature of 25° C.
At higher ambient temperatures a significant DC-component may be introduced in the motor windings due to thermal drift causing additional torque ripple.

Adjustment procedure:

- Remove BTS frontplate, insert amplifier in rack.
- Connect ST 4/2 (1 : 1) to DGND.
- Remove wiring to ST 6/3 and ST 6/4.
- Power on (amplifier enabled).
- Check TP5 with DVM to be 0 Volt.
- Connect DVM to TP1 (see page 16) and TP8 (GND).
- Adjust RP20 (see page 16) until V_{TP1} = 0,0 V_{DC}.
- Connect DVM to TP2 and adjust to Zero with RP21.
- Check TP3 = 0,0 V_{DC}.
- End.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP