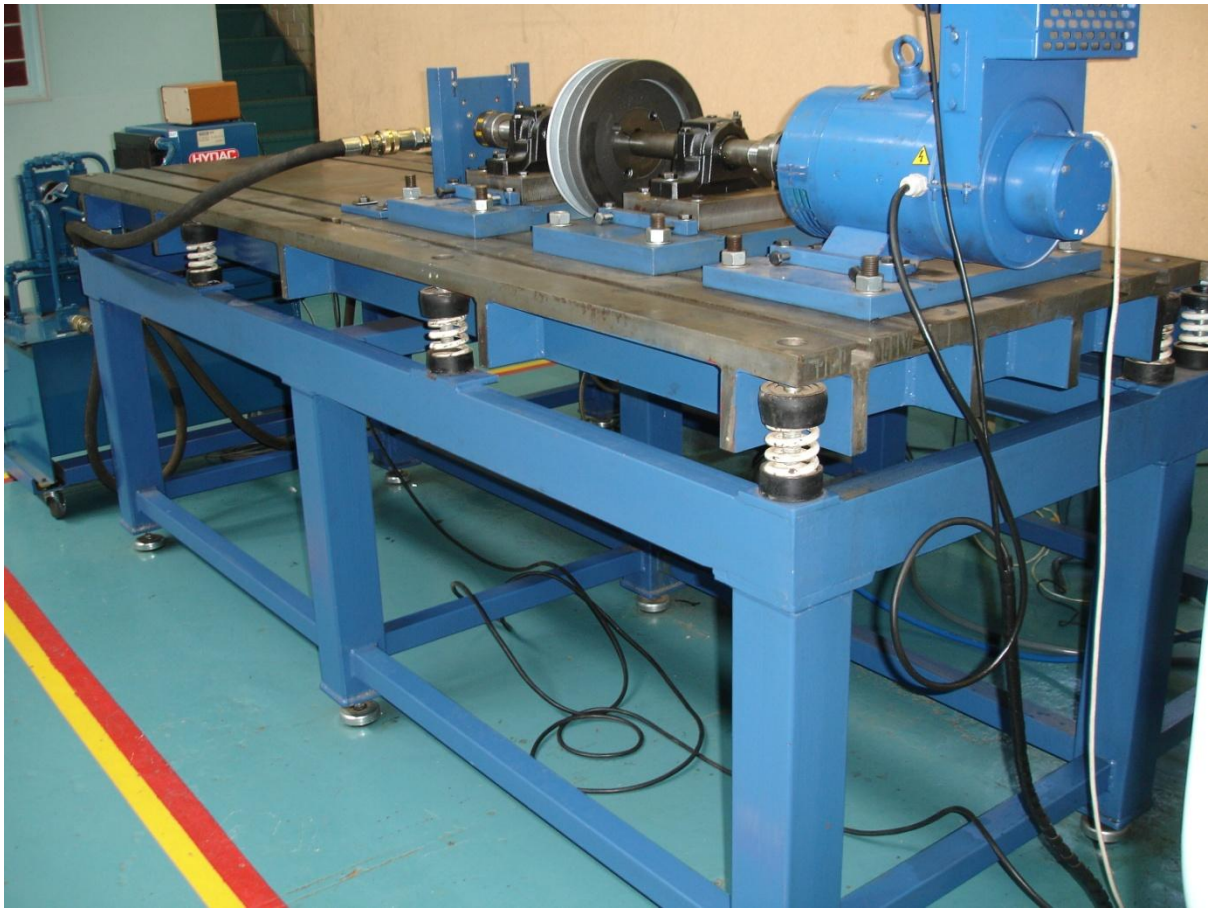
Short description only – for complete manuals see Instrumentation Manuals

Vibration isolated table



Length: 2.5m (Maximum shaft length of **1.8m** between the Electric motor and hydraulic pump)

Width: 0.8m

Height: 1.0m

Centre height: 140mm (can be increased)

Mounting slots: 400mm and 600mm centres respectively

Electric motor

Power: 3 kW DC

Speed: variable up to 3000 rpm (controlled circuitry using shaft-encoder for feedback)

Volts: 180VA

Amps: 19.4

Important

The shaft-encoder used on this motor has a **24v** output. Care should be taken when attempting to connect the encoder directly to a data acquisition system that cannot accommodate 24v. The use of a voltage converter is

recommended. Currently the shaft encoder is integrated with the control circuitry.

Hydraulic pump – ViVOLO KV1M/4.9

The hydraulic pump is driven through the power pack combined with an electro-hydraulic control valve, making it possible to use command loads.

VIVOLO
BOLOGNA ITALY

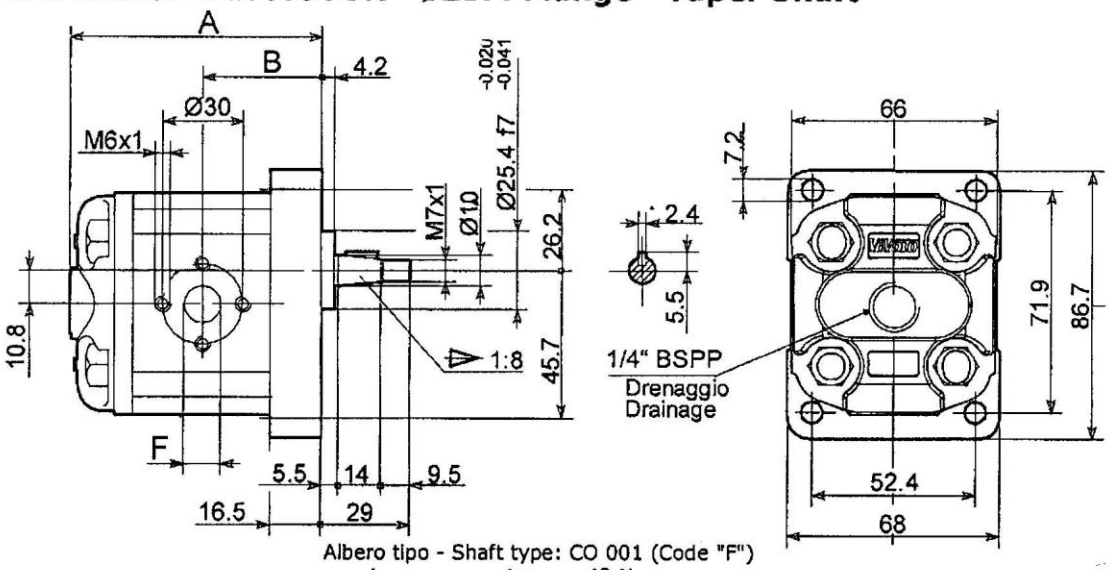
MOTORI BIDIREZIONALI Serie Verde
BIDIRECTIONAL MOTORS Green series

Web address: www.vivoil.com

Gruppo - Group 1

VIVOIL OLEODINAMICA VIVOLO Via Larga 15/8L 40138 Bologna Italy tel +39 051 534834 fax +39 051 530032

MOTORE STANDARD EUROPEO - BASE ø25.4 - Albero conico
STANDARD EUROPEAN MOTOR - ø25.4 Flange - Taper Shaft

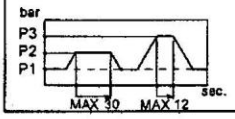


Albero tipo - Shaft type: CO 001 (Code "F")
coppia max - max torque: 43 Nm

TIPO TYPE	F IN - OUT	A	B	Peso Kg Weight Kg	CODICE/CODE	
					Drenaggio esterno External drainage	Drenaggio interno Internal drainage
KV1M/1.7	ø12	79.5	38.5	1.010	1.M.18.01.F.I.I.E	1.M.18.01.F.I.I.F
KV1M/2.2	ø12	81.5	39.5	1.030	1.M.20.01.F.I.I.E	1.M.20.01.F.I.I.F
KV1M/2.6	ø12	83.5	40.5	1.060	1.M.21.01.F.I.I.E	1.M.21.01.F.I.I.F
KV1M/3.2	ø12	85.5	41.5	1.090	1.M.23.01.F.I.I.E	1.M.23.01.F.I.I.F
KV1M/3.8	ø12	87.5	42.5	1.120	1.M.25.01.F.I.I.E	1.M.25.01.F.I.I.F
KV1M/4.3	ø12	89.5	43.5	1.170	1.M.27.01.F.I.I.E	1.M.27.01.F.I.I.F
KV1M/4.9	ø12	92.5	45	1.200	1.M.29.01.F.I.I.E	1.M.29.01.F.I.I.F
KV1M/5.9	ø12	96	46.8	1.260	1.M.31.01.F.I.I.E	1.M.31.01.F.I.I.F
KV1M/6.5	ø12	98.5	48	1.300	1.M.32.01.F.I.I.E	1.M.32.01.F.I.I.F
KV1M/7.8	ø12	102.5	50	1.360	1.M.34.01.F.I.I.E	1.M.34.01.F.I.I.F
KV1M/9.8	ø12	111.5	54.5	1.500	1.M.36.01.F.I.I.E	1.M.36.01.F.I.I.F

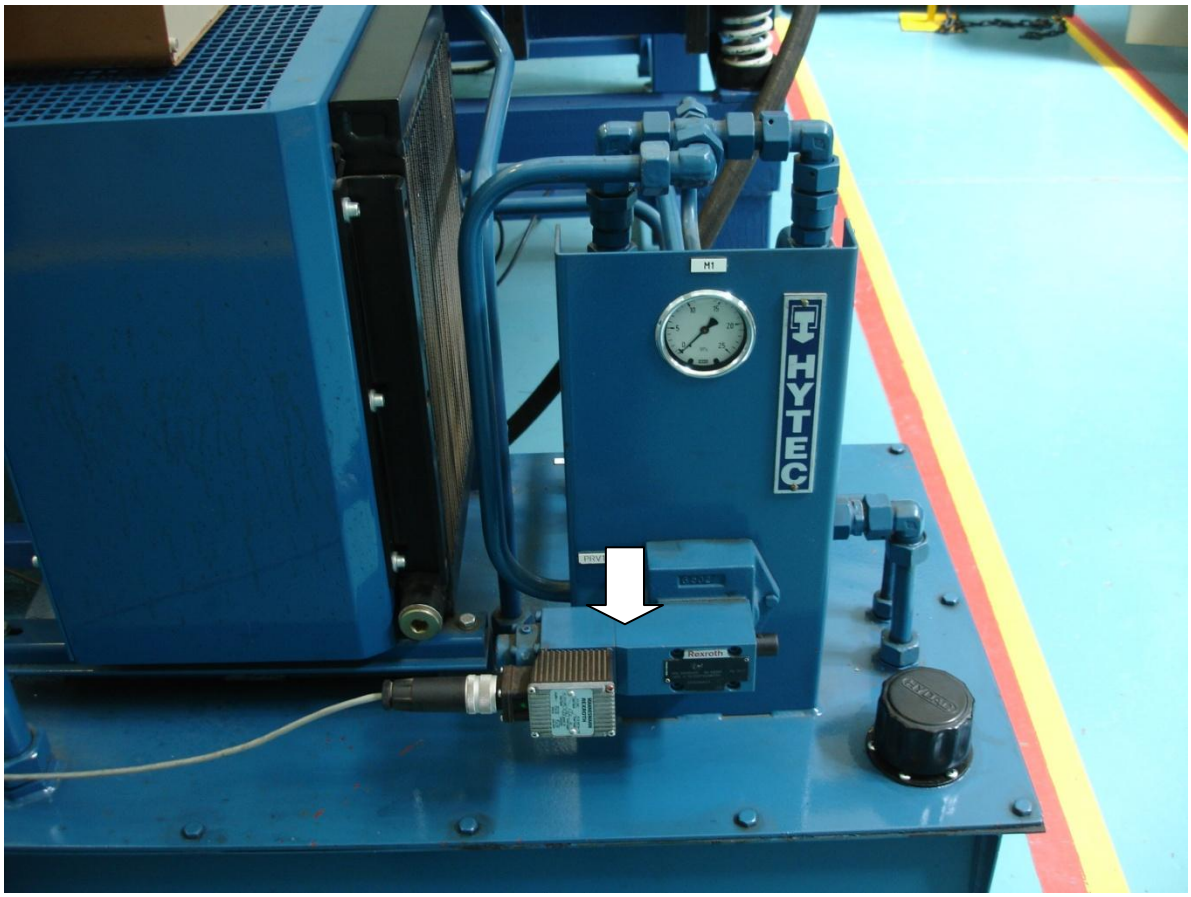
Tipo Type	Cilindrata cm3/giro Displacement cm3/rev	Pressione Max. Max. pressure			Velocità'giri/min Speed rpm		P1=100 bar - 1000 giri/min			Pressione min. di avvio Min. starting pressure (bar)	Pressione max. in uscita Max. outlet pressure (bar)	Pressione max. nel drenaggio Max. pressure in the drainage (bar)
							Potenza resa Output power		Coppia Torque			
		P1	P2	P3	MAX	MIN.	KW	HP	daN.m			
KV1M /1.7	1.56	230	260	275	5000	650	0.29	0.4	0.24	30	100	6
KV1M/2.2	2.08	230	260	275	5000	650	0.34	0.46	0.32	25	100	6
KV1M /2.6	2.6	230	260	275	5000	650	0.42	0.57	0.4	20	100	6
KV1M /3.2	3.12	230	260	275	5000	650	0.51	0.69	0.48	15	100	6
KV1M /3.8	3.64	230	260	275	5000	650	0.6	0.8	0.56	15	100	6
KV1M/4.3	4.16	230	260	275	5000	650	0.68	0.92	0.65	15	100	6
KV1M/4.9	4.94	230	260	275	5000	650	0.81	1.09	0.78	15	100	6
KV1M /5.9	5.85	230	260	275	4500	650	0.96	1.29	0.93	15	100	6
KV1M/6.5	6.5	230	260	275	4500	650	1.07	1.44	1.03	10	100	6
KV1M /7.8	7.54	200	220	240	4000	650	1.24	1.67	1.19	10	100	6
KV1M/9.8	9.88	170	190	200	3500	650	1.63	2.19	1.57	10	100	6

12 teeth



12 teeth on gearing.

Rexroth proportional pressure relief valve



Control voltage: 0-10v (through the power pack control)

Maximum operating pressure: 315 bar

Maximum flow: 30 L/min

Tests carried out using a function generator showed the fastest rate of load change to be 0.3 sec at 700 mHz.

Technical data (for applications outside these parameters, please consult us!)

General

Installation			Optional
Storage temperature range		°C	– 20 to + 80
Ambient temperature range	DBE and ZDBE	°C	– 20 to + 70
	DBEE and ZDBEE	°C	– 20 to + 50
Weight	DBE and ZDBE	kg	2.4
	DBEE and ZDBEE	kg	2.5

Hydraulic (measured with HLP 46; ϑ_{oil} = 40 °C ± 5 °C)

Max. operating pressure	Ports P ; P1 – P2; A1 – A2; B1 – B2	bar	315
	Port T	bar	50
Max. settable pressure	Pressure stage 50 bar	bar	50
	Pressure stage 100 bar	bar	100
	Pressure stage 200 bar	bar	200
	Pressure stage 315 bar	bar	315
Min. settable pressure with a zero a command value		bar	See characteristic curves on page 8
Return pressure port A; with external pilot oil drain (Y)			Separate and at zero pressure to tank
Pilot oil flow		L/min	0.6 to 1.2
Max. flow		L/min	30
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 Other pressure fluids on request!
Pressure fluid temperature range		°C	– 20 to + 80
Viscosity range		mm²/s	15 to 380
Cleanliness class to ISO code			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15[1]
Hysteresis		%	± 1.5 of max. settable pressure
Repeatability		%	< ± 2 of max. settable pressure
Linearity		%	± 3.5 of max. settable pressure
Example spread of the com. value-pressure-char. curve, referring to the hysteresis-char. curve, pressure increasing	DBE und ZDBE	%	± 2,5 of max. settable pressure
	DBEE und ZDBEE	%	± 1.5 of max. settable pressure
Step response $T_u + T_g$	10 % → 90 %	ms	Approx. 80] depending on
	90 % → 10 %	ms	Approx. 50] installation

Electrical

Voltage type			24 V DC
Min. control current		mA	100
Max. control current		mA	1600
Coil resistance	Cold value at 20°C	Ω	5.4
	Max. warm value	Ω	7.8
Duty		%	100
Electrical connections	DBE and ZDBE		With component plug to DIN EN 175 301-803
			Plug-in connector to DIN EN 175 301-803 [2]
	DBEE and ZDBEE		With component plug to E DIN 43 563-AM6-3
			Plug-in connector to E DIN 43 563-BF6-3/Pg11 [2]
Valve protection to DIN 40 050			IP 65 with mounted and fixed plug-in connector

[1] The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081

[2] Separate order, see page 5

Technical data (for applications outside these parameters, please consult us!)

Electrical

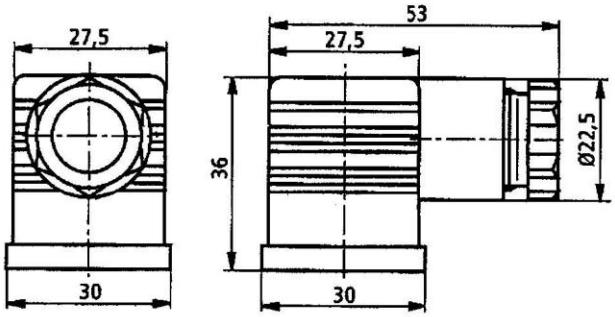
Control electronics		
– For DBEE and ZDBEE		Integrated into the valve, see page 6
– For DBE and ZDBE		
• Amplifier in Eurocard format	Analogue	VT-VSPA1-1 to catalogue sheet RE 30 111
(separate order)	Digital	VT-VSPD-1 to catalogue sheet RE 30 123
• Amplifier of modular design (separate order)	Analogue	VT 11131 to catalogue sheet RE 29 865

Note: For details regarding the **environmental simulation test** covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 158-U (declaration regarding environmental compatibility).

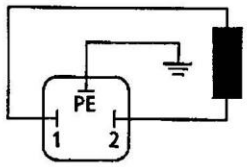
Electrical connections, plug-in connector

For types DBE, ZDBE (for external control electronics)

Plug-in connector to DIN EN 175 301-803
Separate order under Material No. **R900074684**



Connections at component plug

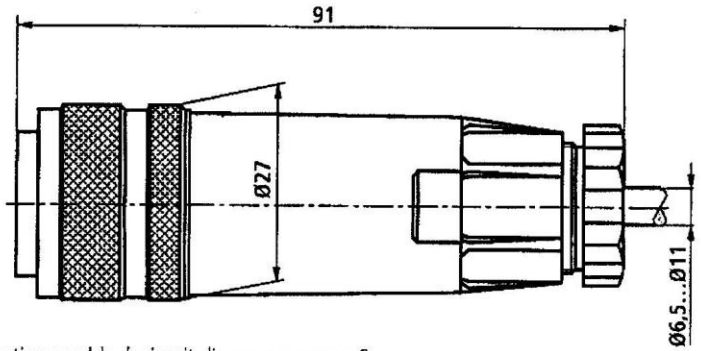


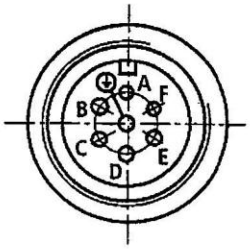
Connections at plug-in connector

To amplifier

For types DBEE, ZDBEE (with integrated control electronics)

Plug-in connector to E DIN 43 563-BF6-3/Pg11
Separate order under Material No. **R900021267**
(plastic version)





For pin allocation see block circuit diagram on page 6

Funetion

The control of the integrated electronics is via the two differential amplifier connections D and E.

The ramp generator produces from a command value jump (0 to 10 V or 10 to 0 V) a delayed increase or decrease in the solenoid current. At potentiometer R14 the rate of increase in time and at potentiometer R13 the rate of decrease in time of the solenoid current can be set.

The ramp times of 5 s is only possible over the complete command value range. With smaller command value changes the ramp time is accordingly shortened.

Via the characteristic curve generator, the command value-solenoid current characteristic curve is so matched to the valve, that non-linearities in the hydraulics can be compensated for, so that a linear command value-pressure-characteristic curve is obtained.

The current regulator controls the solenoid current independently from the solenoid coil resistance.

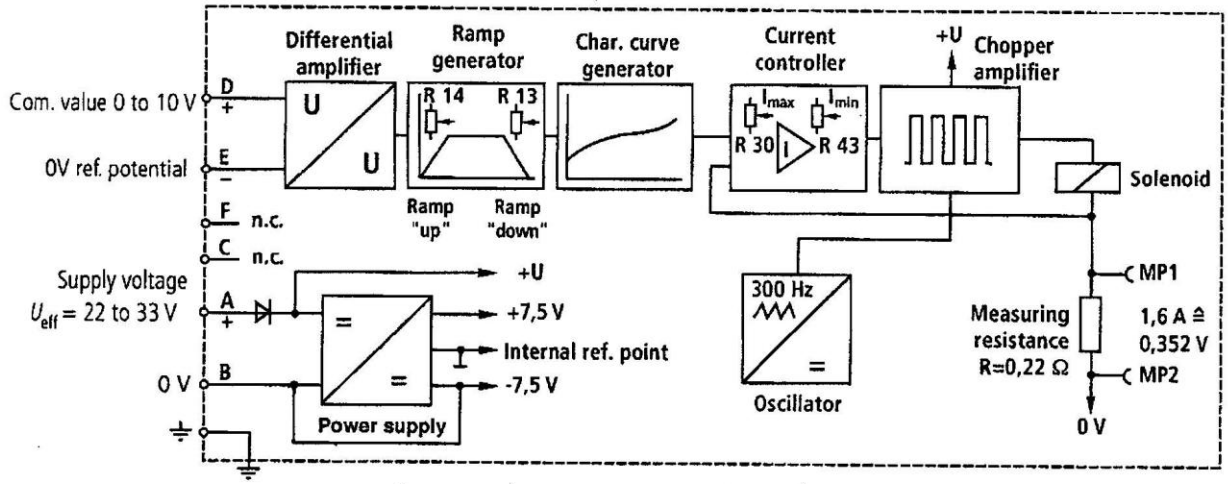
At potentiometer R30 the increase of the command value-current-characteristic curve, and thereby also the increase rate of the command value-pressure-characteristic curve of the proportional pressure valve may be altered.

The potentiometer R43 is used to adjust the biasing current. This setting should not be altered. If necessary, the zero point of the command value-pressure-characteristic curve can be adjusted at the valve seat.

The power stage of the electronics for the control of the proportional solenoid forms a chopper amplifier. It is pulse width modulated with a pulse frequency of 300 Hz.

The solenoid current may be measured at the two measurement sockets MP1 and MP2. A voltage drop of 0.352 V at the measurement resistor relates to a solenoid current of 1.6 A.

Block circuit diagram / pin allocation of the integrated control electronics



yellow
green
red
blue

200k ✓ R13 0 26.1k
R14 0 26.6k

Supply voltage

Power supply with rectification

Single phase rectification or three phase bridge: U_{eff} = 22 to 33 V

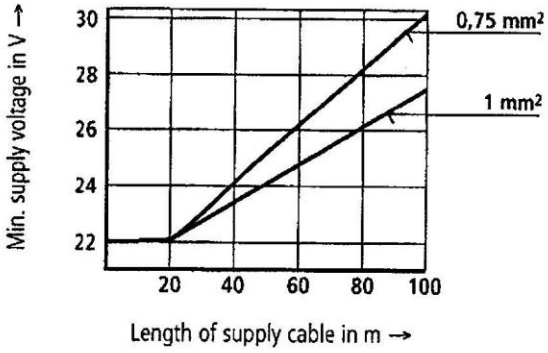
Residual ripple at power supply: < 5 %

Output current: I_{eff} = max. 1.4 A

Supply cable:
- Recommended 5 core 0.75 or 1 mm² with protective conductor and screen
- Outside diameter 6.5 to 11 mm
- Screen to 0 V supply voltage
- Max. permissible length 100 m

The minimum supply voltage at the power supply is dependent on the length of the supply cable (see diagram).

For lengths > 50 m a capacitor of 2200 µF must be installed near the valve in the supply line.

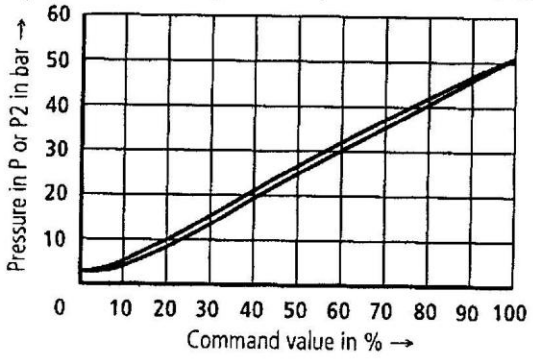


A - red
B - blue
C - yellow
D - green

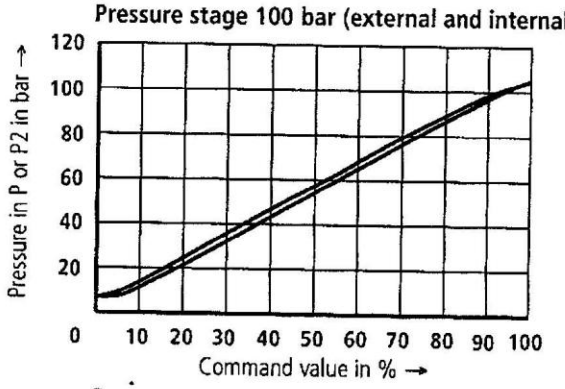
Characteristic curves (measured with HLP 46; ϑ_{oil} = 40 °C ± 5 °C)

Pressure in ports P or P2 in relation to the command value (q_V = 5 L/min)

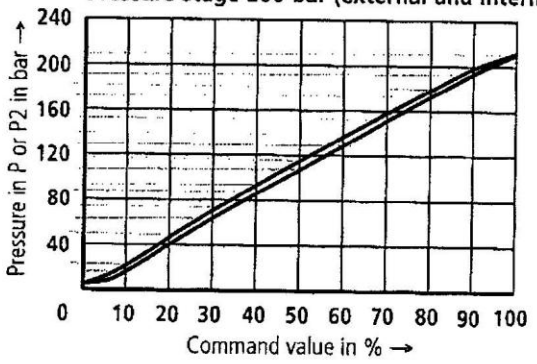
Pressure stage 50 bar (external and internal)



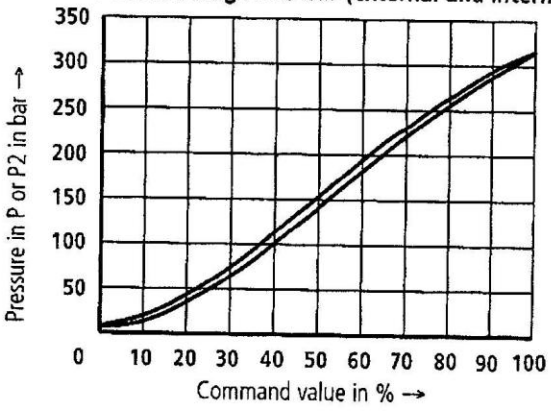
Pressure stage 100 bar (external and internal)



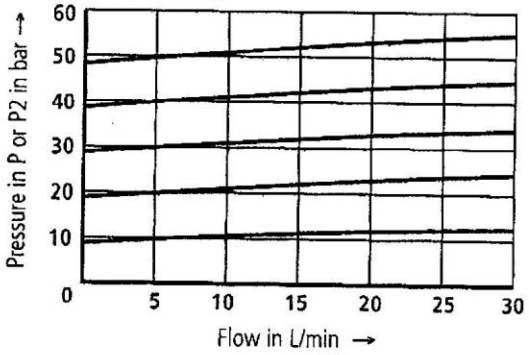
Pressure stage 200 bar (external and internal)



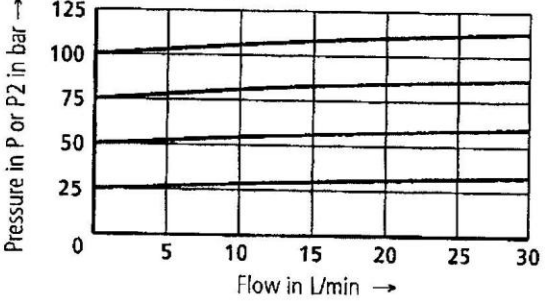
Pressure stage 315 bar (external and internal)



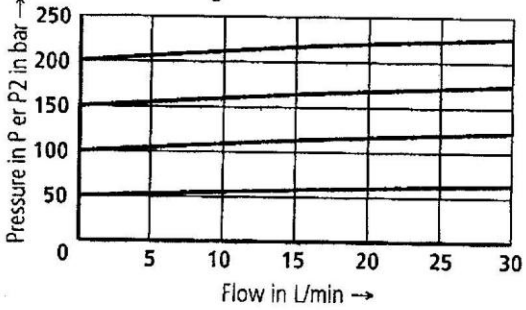
Pressure stage 50 bar



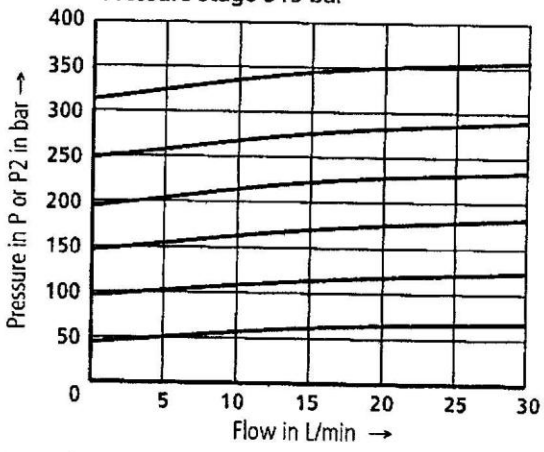
Pressure stage 100 bar



Pressure stage 200 bar



Pressure stage 315 bar



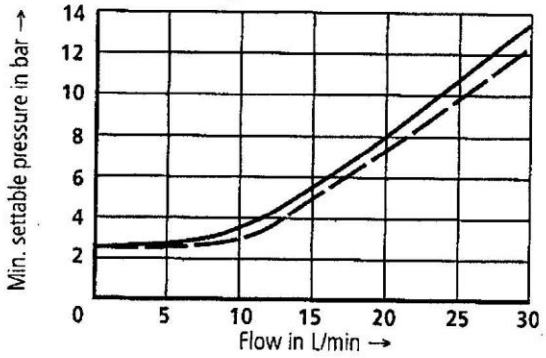
The characteristic curves were measured without back pressure at port A (external pilot oil drain) and T (internal pilot oil drain).
With an internal pilot oil drain the pressure in P or P2 increases by the pressure acting in port T.

Characteristic curves (measured with HLP 46; ϑ_{oil} = 40 °C ± 5 °C)

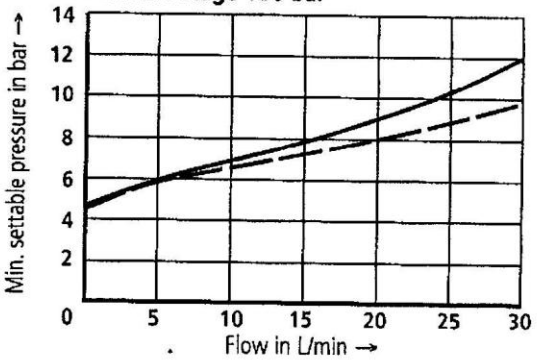
Min. settable pressure at port P or P2 with a 0 command value

Pilot oil drain ——— internal – – – external

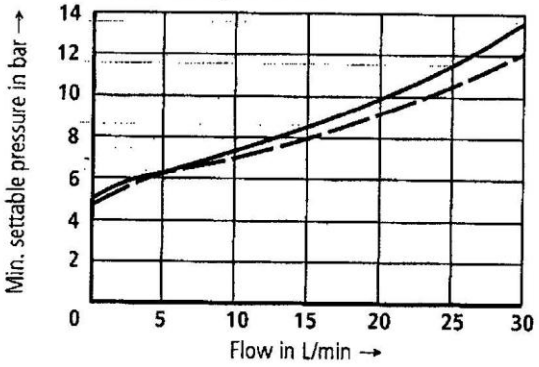
Pressure stage 50 bar



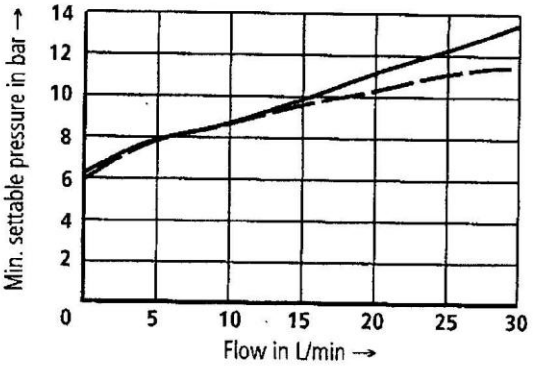
Pressure stage 100 bar



Pressure stage 200 bar

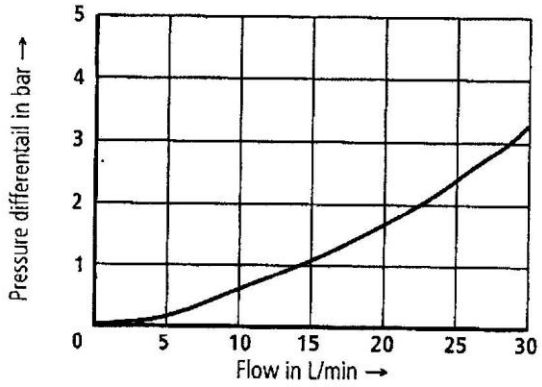


Pressure stage 315 bar

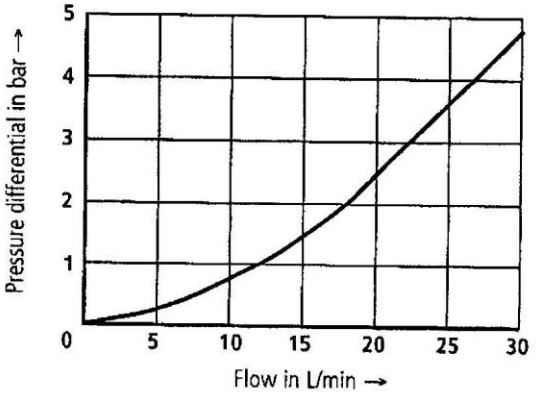


The characteristic curves were measured without back pressure at port A (external pilot oil drain) and T (internal pilot oil drain).
With an internal pilot oil drain the pressure in P or P2 increases by the pressure acting in port T.

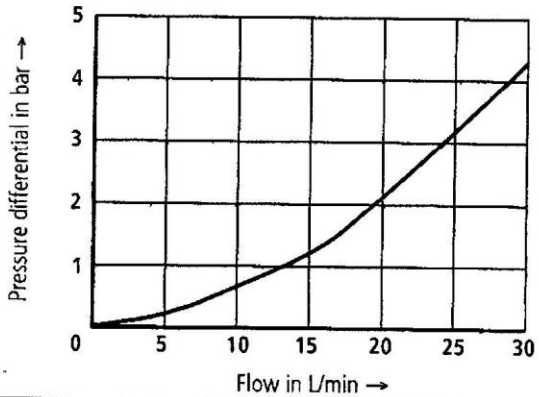
Pressure differentail A1 → A2 und B1 → B2



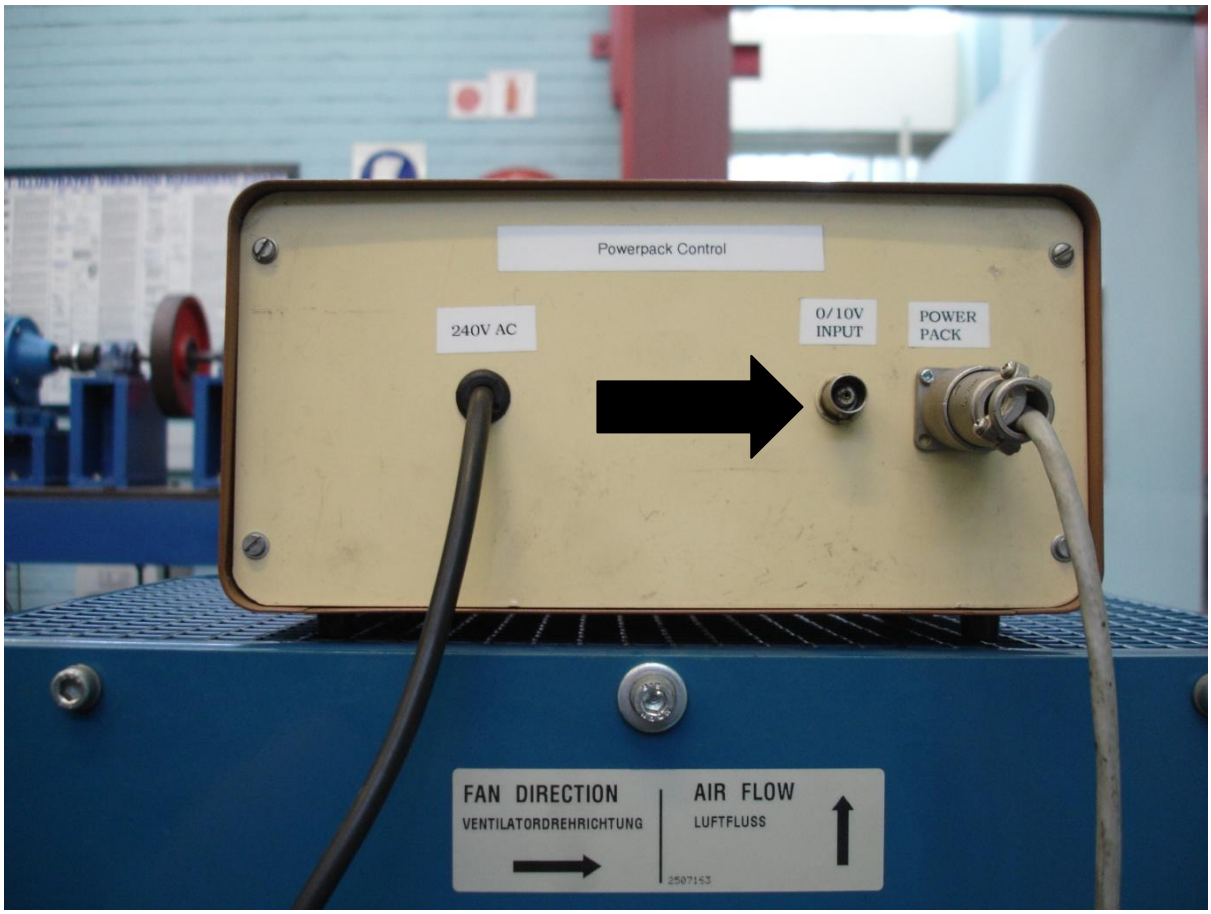
Pressure differential P1 → P2



Pressure differential T1 → T2



Power pack control (input 0-10V)

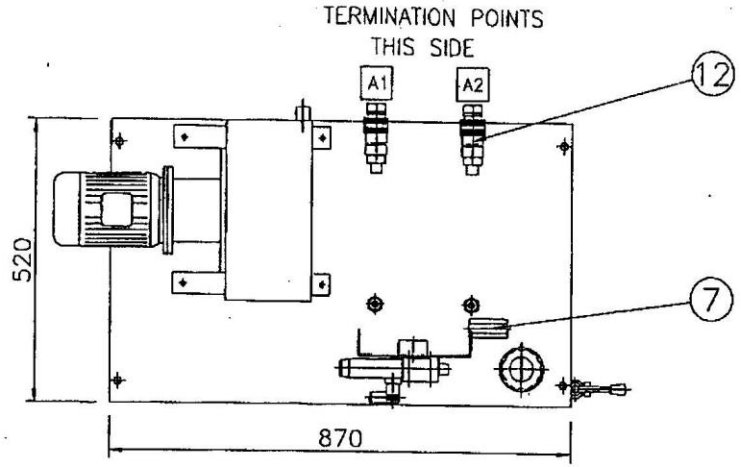


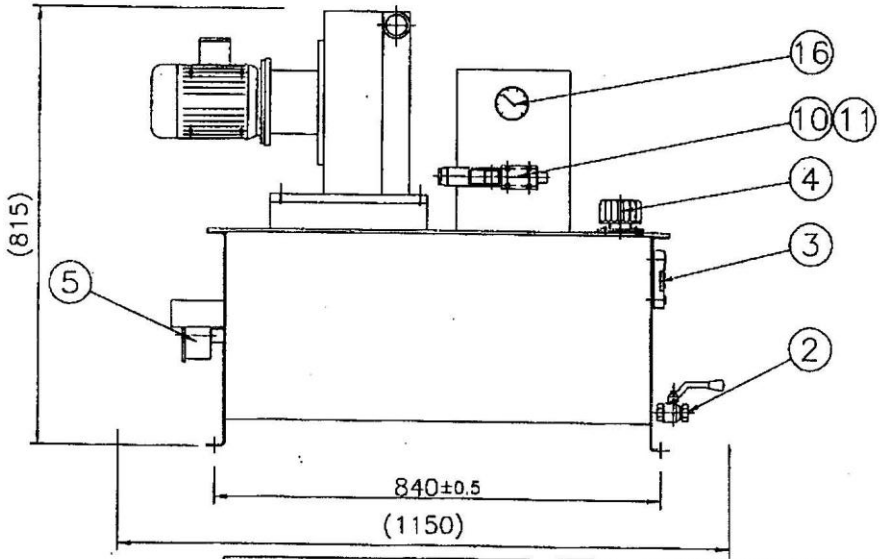
Input: 0-10V

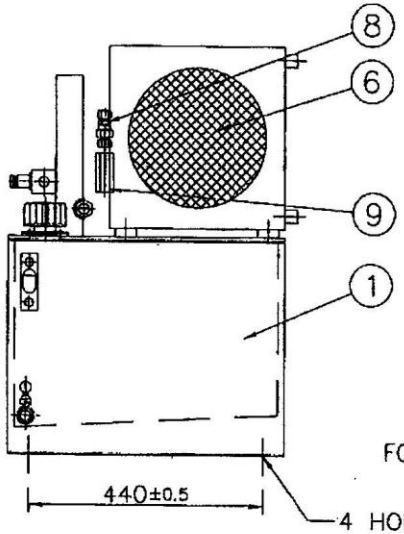
Hydraulic power pack

Maximum operating pressure: 20 MPa

Installed power: 1.5 kW







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2004 -03- 31
SPARTAN
DRAWING OFFICE

FOR HYDRAULIC CIRCUIT SEE DRG. No. A3-3906-00 SHT.1

JOB No. 651586

CUSTOMER HYTEC PTA – UNIVERSITY OF PRETORIA
PROJECT
REMARKS

SCALE 1:10 | WEIGHT ±220 Kg
MATERIAL ----- | SHEET 1 OF 1

GENERAL TOLERANCES OF FORM & POSITION DIN 3141 R3

DEFINITION	SYMBOL	DEFINITION	SYMBOL
STRAIGHTNESS	—	PARALLELISM	//
ROUNDNESS	○	PERPENDICULAR	⊥
LINE FORM	⌒	INCLINATION	∠
PLANENESS	▱	SYMETRICAL	≡
CYL FORM	⌭	CONCENTRICITY	◎
LAMINAR SURF TOL	⌓	TRUENESS	/

SURFACE SYMBOL	PEAK TO VALLEY HEIGHT Rt um	SURFACE-TEXTURE SYMBOL TO ISO R1302 ROUGHNESS VALUE Ra um & GRADE No.		MACHINING TOLER. ACC TO DIN 7168 & ISO 2768		
				DIMENSIONS UP TO	TOLERANCES MACHINED	TOLERANCES UNMACHINED (CASTING)
	63	50	N12			
		25	N11			
		12.5	N10			
	16	6.3	N9			
		3.2	N8			
		1.6	N7			
	4	0.8	N6	6	±0.1	±0.5
		0.4	N5	30	±0.2	±1.0
		0.2	N4	100	±0.3	±1.5
	1	0.1	N3	300	±0.5	±2.0
		0.05	N2	1000	±0.8	±3.0
		0.025	N1	2000	±1.2	±5.0

	DATE	NAME
DESIGN		
DRAWN	30-03-2004	VJ
CHECK	31-03-2004	GJS
APP.	31-03-2004	GJS

CAD

HYTEC (PTY(Ltd

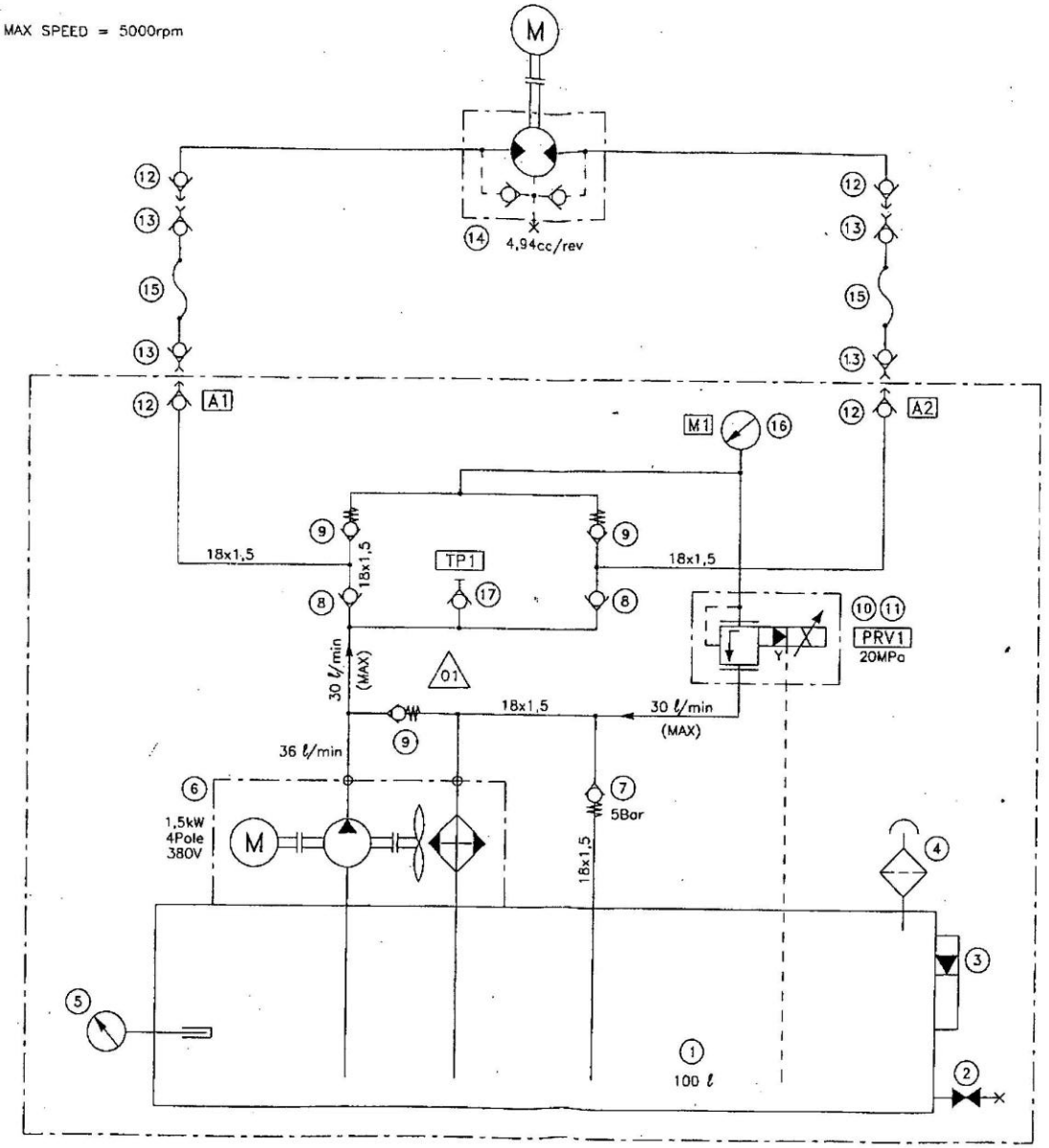
(ORIGIN:) A3-3906-021/1

DESCRIPTION
GENERAL ARRANGEMENT
LOAD SIMULATION POWER PACK
(100 L LD RESERVOIR + COOLER)

DRAWING IDENT. No
A33906-02-00

(SUPERSEDED BY:) | (SUPERSEDES:)

NOTE: DC MOTOR MAX SPEED = 5000rpm



NOTE: OIL TYPE – ISO VG46.

HYTEC
2004 -04- 01
SPARTAN DRAWING OFFICE

CAD

DRAWN	CHECK.	APPD.
MC	DS	FJ

HYTEC (PTY) Ltd

REV	DETAILS OF CHANGE	DATE	SIGN
00	ORIGINAL ISSUE	02-03-2004	FJ
01	AS BUILT UPDATE	01-04-2004	

TITLE.
DC MOTOR LOAD SIMULATION
POWER PACK
HYDRAULIC CIRCUIT DIAGRAM

CUSTOMER.
HYTEC PTA – UNIVERSITY OF PRETORIA

FILE: 3906-001/2

JOB No. 6 5 1 5 8 6

DRAWING No. A3-3906-00-01

SH. 1 OF 1