FACTORY OF ELECTRIC APPARATUS

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ELECTROMAGNETIC DISC BRAKES

H2S SERIES

WITH CONSTANT BRAKING TORQUE

K-EN-H2S-20151203

Direct current brake series H2S characterizes relatively simple construction, facility for regulating brake parameters such as braking torque (reduction of springs), braking time (by way of appropriate electrical connection) and also possibility of supply from alternating current source after connecting up a rectifier circuit delivered at customer's request along with the brake. An additional feature is quiet operation, particularly important when the equipment is operated by a number of drives operating additionally with high frequency of actuations. Brake parameters regarding time for actuating and releasing in spite of simplicity do not differ from brake series H2SP and should be considered as comparable. The fact should be stressed that parameters of loading and braking energy that can be transferred are comparable with series H2SP in spite of its considerably simplified construction. It is characterized by high reliability of operation, stability of technical parameters as well as short braking and releasing times.

Brake design guarantees simple and problem-free installation. Various options of executions are at disposal with respect to fittings/accessories, brake supply, climatic conditions of utilization, enabling selection of appropriate option for definite utilization conditions

They are designed for braking rotating parts of machines and their task is:

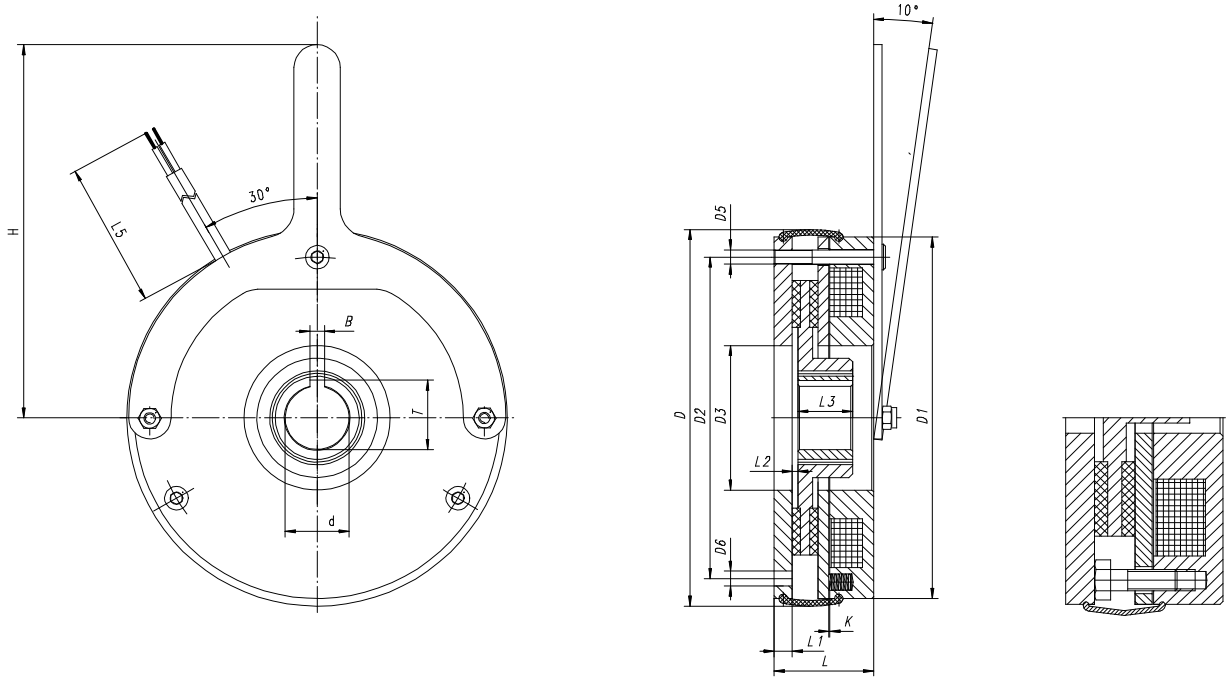
- ❖ emergency stopping, in order to ensure drive safety functions,
- ❖ immobilizing machine actuators, acting as a positioning device,
- ❖ minimizing run-on times of drives (to meed safety requirements according to Office of Technical Inspection (UDT) regulations,
- ❖ built onto an electric motor, the brake provides a self-braking motor, a drive unit meeting the requirements of utilisation safety and positioning.

Brakes can be manufactured in variants suitable for various direct-current voltages: 24V, 104V, 180V, 207V which allows them to be supplied from standard alternating current sources, through appropriate rectifier.

Parameters			Unit	Brake type						
				H2S 71	**H2S 80**	**H2S 90**	**H2S 100**	**H2S 112**	**H2S 132**	**H2S 160**
Supply voltage		Un	[V]	24, 104, 180, 207 VDC						
Power		$P_{20°}$	[W]	18	25	25	35	35	35	60
Max. obroty		$n_{max.}$	min^{-1}	3000						
Braking torque		M_h	Nm	8	14	14	26	26	26	60
Weight		G	kg	0,8	1,2	1,2	1,9	1,9	1,9	3,5
Protection rating				IP44						
Ambient temperature			°C	-25 ÷ +40						
Operating time *	On direct voltage side	$t_{0,1}$	ms	40	50	40	80	80	80	100
		$t_{0,9}$		25	45	45	65	65	65	85
	On alternating voltage side	$t_{0,1}$	ms	40	50	40	80	80	80	100
		$t_{0,9}$		Brake disconnection on alternating current side causes about five-times growth in braking time t_{09} with respect to disconnection on direct current side						

$t_{0,1}$ - releasing time (from switching on current to drop in braking torque to 10% M_{nom})
$t_{0,9}$ - braking time (from switching off current to attaining 90% M_{nom})

*) Values of releasing and braking times are given as approximations, since they depend on mode of assembly/installation, temperature and power supply.



Type	D	D1	D2	D3	D5	D6	L	L1	L2	L3	L5	H	d	B	T	K
H2S 71	110	103	93	30	3xM5	3x5,5	35	7	2,5	20	450	115	15	5	17,3	0,2
H2S 80	133	126	116	45	3xM5	3x5,5	38	8	2,5	20	450	135	19	6	21,8	0,2
H2S 90	133	126	116	45	3xM5	3x5,5	38	8	2,5	20	450	135	24	6	27,3	0,2
H2S 100	162	154	139	60	3xM6	3x6,4	49	10	3,0	30	450	250	24	8	27,3	0,2
H2S 112	162	154	139	60	3xM6	3x6,4	49	10	3.0	30	450	250	25	8	28,3	0,2
H2S 132	162	154	139	60	3xM6	3x6,4	49	10	3,0	30	450	250	30	8	33,3	0,2
H2S 160	208	200	178	80	3xM8	3x8,4	58	10	3,0	30	450	290	35	10	38,3	0,2

ELECTRICAL EQUIPMENT

A number of modules, ranging from simple circuits with classic designs, to complex assemblies ensuring quick action and drives positioning have been designed to drive the brakes. Relevant brake applications with switching in the primary or secondary circuits are ensured by half- or full-wave rectifiers and fast electronic circuits. The manufacturer recommends to use as low alternating current voltages as possible to supply the brakes. Appropriate choice of the control voltage will prevent or at least limit surges that may occur in power supply circuits. It is not recommended to use extensively long control wiring, which would be a source of harmful surges.

Rectifier B2-1P

The B2–1P rectifiers series forms a complete wave rectifier unit for direct installation. The terminal strip provided facilitates installation and connection to the circuit.

RECTIFIER PARAMETERS			
		B2-1P-400	**B2-1P-600**
Maximum input voltage (alternating voltage AC)	U_{IN}	400 VAC	600 VAC
Maximum output voltage (direct voltage DC)	U_{OUT}	0,45 U_{IN}	0,45U_{IN}
Maximum continuous output current rectifier	I_{OUT}	2A	2A

For example

Maximum input voltage
(alternating voltage) - U_{IN} = 230VAC,

The resulting output voltage of the rectifier
(direct voltage) - 0,45U_{IN}= 0,45 x 230=104VDC

Rectifier B2-2P

The B2–2P rectifiers series forms a complete full-wave rectifier unit for direct installation. The terminal strip provided facilitates installation and connection to the circuit. The rectifier allows feeding input voltage max. 400VAC, 2A which after rectification provides DC voltage of value equal to 0,9 input voltage.

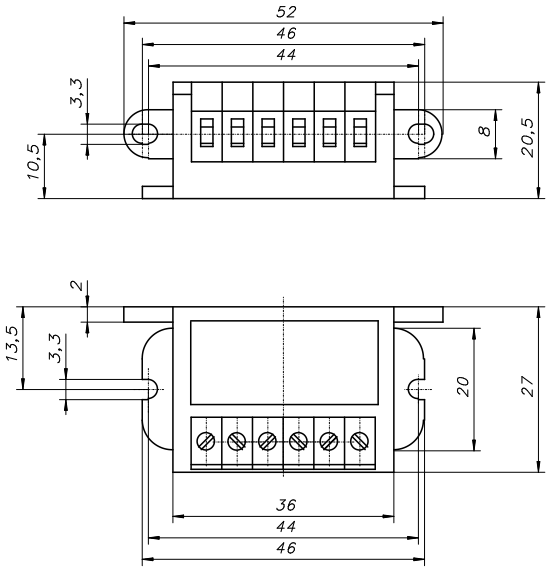
RECTIFIER PARAMETERS		
Maximum input voltage (alternating voltage AC)	U_{IN}	250 VAC
Maximum output voltage (direct voltage DC)	U_{OUT}	$0{,}9U_{IN}$
Maximum continuous output current rectifier	I_{OUT}	2A

For example

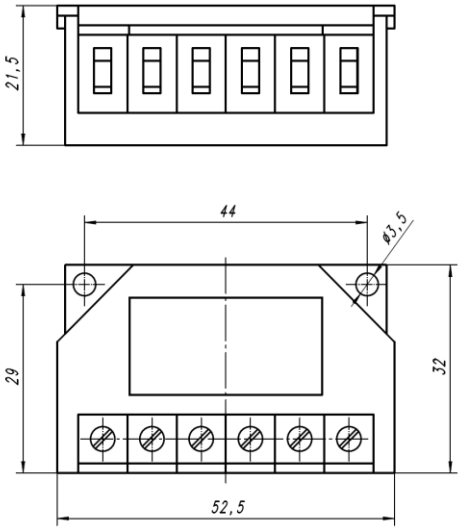
Maximum input voltage (alternating voltage) - U_{IN} = 230VAC,
The resulting output voltage of the rectifier (direct voltage) - $0{,}9U_{IN}$= 0,9 x 230=207VDC

Rectifiers dimensions

B2-1P-400,
B5-1P-400,
B2-2P

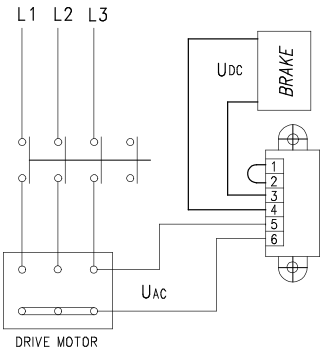


B2-1P-600,
B5-1P-600



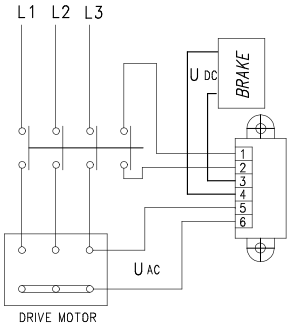
Disconnection of power supply on AC side

The diagram presents connection of rectifiers to supply circuit of motor. When disconnecting the voltage, the magnetic field causes the coil current to flow further through the rectifying diodes and drops slowly. The magnetic field reduces gradually causing prolonged time of braking action and consequently delayed increase of braking torque. If action time is irrelevant, brake should be connected on the AC side. When switching off, the supply circuits act as rectifying diodes.

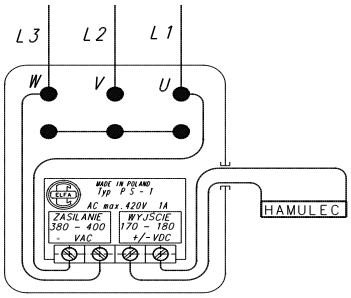


Disconnection of power supply on DC side

The diagram presents connection of rectifiers into electric motor circuit. The coil current is interrupted between the coil and supply (rectifier) circuit. The magnetic field reduces very quickly, **giving short time of braking action and consequently rapid growth of braking torque**. When switching off on DC voltage side, a high peak voltage is generated in the coil causing faster wear of contacts due to sparking. For protecting the coil against peak voltages and protecting the contacts against excessive wear, the rectifier circuit is provided with protective facility allowing brake connection on DC voltage side.



Rectifier PS-1



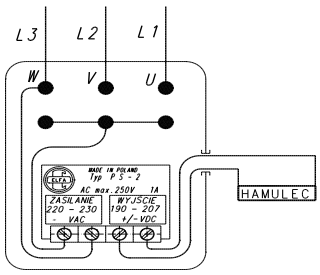
Circuit PS-1 is built on the basis of MOSFET type semiconductor technique which enabled achieving effects not available in traditional designs. The brake electromagnet energized through circuit of this construction enables the brake to achieve connection and disconnection time parameters analogous to breaking of circuit on direct current side. The parameters obtained are not however gained through utilization of additional electrical circuits and switches.

Simplicity of installation and parameters achieved enable very wide application, particularly in cases requiring positioning of drives, operation with high frequency of actuations compounded with repeatability of brake connecting and disconnecting times.

Supply circuit PS-1 forms a complete unit for direct installation. Provided with a four-terminal strip, it enables unhindered adaptation in every cooperating circuit. The circuit is adapted for supply from alternating current source of 380-400 VAC max. 420 VAC which after rectification and appropriate formation enables obtaining direct voltage of 170-180 VDC for brake supply.

The diagram below shows the method of connecting the circuit PS 1 into supply circuit of brake cooperating with 3x400 VAC electric motor with star-connected winding.

Rectifier PS-2



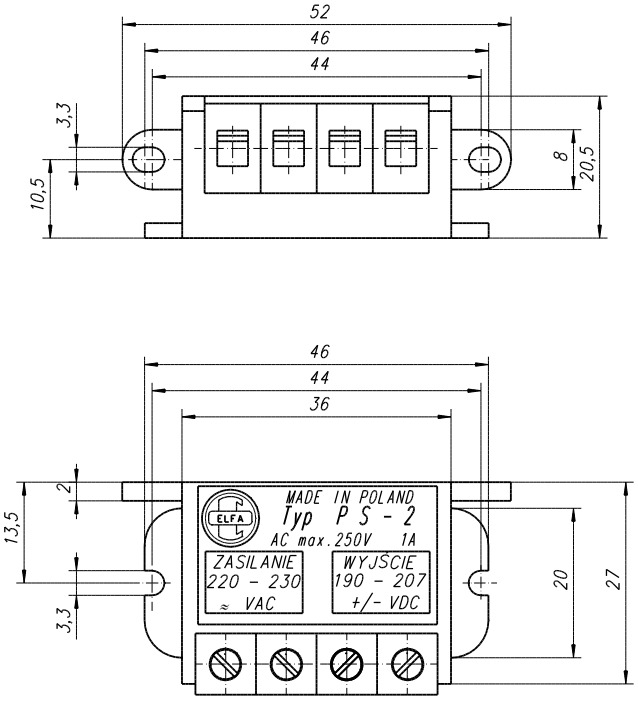
Circuit PS-2 is built on the basis of MOSFET type semiconductor technique which enabled achieving effects not available in traditional designs. The brake electromagnet energized through circuit of this construction enables the brake to achieve connection and disconnection time parameters analogous to breaking of circuit on direct current side. The parameters obtained are not however gained through utilization of additional electrical circuits and switches.

Simplicity of installation and parameters achieved enable very wide application, particularly in cases requiring positioning of drives, operation with high frequency of actuations compounded with repeatability of brake connecting and disconnecting times.

Supply circuit PS 2 forms a complete unit for direct installation. Provided with a four-terminal strip, it enables unhindered adaptation in every cooperating circuit. The circuit is adapted for supply from alternating current source of 220-230 VAC max. 250 VAC which after rectification and appropriate formation enables obtaining direct voltage of 190-207 VDC for brake supply.

The diagram below shows the method of connecting the circuit PS 2 into supply circuit of brake cooperating with 3x400 VAC electric motor with star-connected winding.

Rectifiers PS-1, PS-2 dimensions



H2S [ ] [ ] . [ ] **VDC** [ ] **Nm** **d** [ ] [ ]

LEVER FOR MANUAL RELEASE	Y

CLIMATIC VERSION
ACCORDING TO STANDARDS: e.g. MT, TH

MECHANICAL SIZE
71 , 80 , 90 , 100 , 112 , 132 , 160

DIAMETER OF SLEEVE GEAR d(H7)

NOMINAL BRAKING TORQUE [Nm]						
H2S 71	**H2S 80**	**H2S 90**	**H2S 100**	**H2S 112**	**H2S 132**	**H2S 160**
8	14	14	26	26	26	60

EXAMPLE:

H2S 112 . 104VDC 26Nm d25

OPERATING VOLTAGE [V DC]
24, 104, 180, 207

The producer reserves the right to modify as a result of developing the product.
It is possible to realize special versions.