

# Economy circuit plug type MSE 28 026 for 24 VDC

With adjustable economy voltage and  
PLC-compatible switch amplifier

## 1. General

### 1.1 Economy circuit

The final power of an actuation solenoid when in its working position is normally much higher than the power required to safely hold a valve in its position. An economy circuit serves to reduce this final power of the solenoid as soon as the valve has achieved its working position, by cutting back the voltage applied in accordance with the specific type of valve used. Since the coil temperature of a solenoid increases at a square rate to the coil voltage applied, any reduction of the coil voltage will substantially reduce the heating effect and, as a result will considerably extend the service life of the solenoid coil. While not required for standard operations, an economy circuit may prove very worthwhile indeed, when a system is energized permanently or for prolonged periods with only short breaks or in general, when high ambient temperatures are anticipated. The same applies when neighbouring valves within a valve bank are energized simultaneously for prolonged periods. Quite generally, a reduction in terminal temperature will enhance the switching performance when operated at the limits of  $Q_{\max}$  and  $p_{\max}$ .



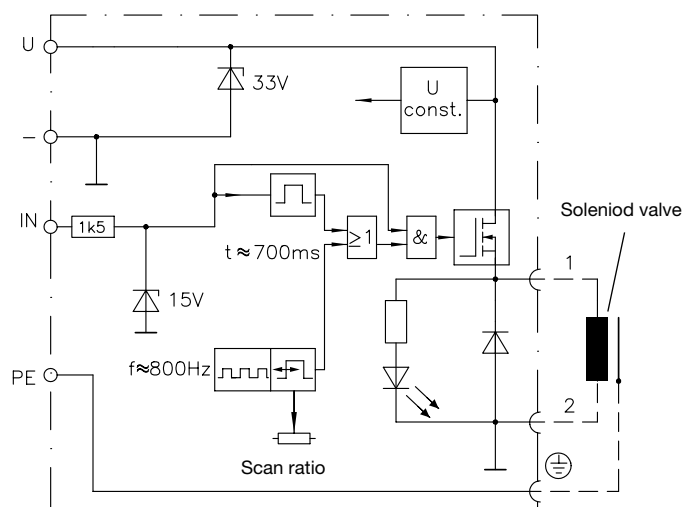
### 1.2 Switch amplifier

The economy circuit features an additional low signal input (IN) for switching a valve via a max. control current of 15 mA, e.g. for PLC control outputs.

### 1.3 Functional description

During switch-on, the terminal stage is fully active, and the solenoid receives full voltage. After a pre-set period ( $\approx 700$  ms) it switches over to pulse width-modulated operation (PWM), i.e. it switches over to hold or economy voltage. It is freely adjustable, but the time period should be selected that the valve position can be safely maintained i.e. well above the response time of the solenoid, as this time will be prolonged if the solenoid gets hot. A yellow LED beneath the translucent cover indicates when the coil is energized. The factory pre-setting of change-over time and holding voltage is sufficient for virtually all relevant solenoid valves. Due to the clamp diode (extinction diode) fitted internally within outputs 1 and 2, the switching-off period may increase considerably.

Wiring diagram



U = Supply voltage +  
IN = Control voltage  
- = Ground (GND)  
PE = Protective conductor

## 2. Technical data, type designation

### 2.1 General data

Type coding	MSE 28026
Nomenclature	Economy circuit with electronic amplifier
Design	Plug with connection pattern DIN EN 175301-803 form A (DIN 43 650 form A), 2-pole + PE
Cable input	PG 9 for cables with a sheath diameter of 4 ... 8 mm
Connection in housing	Terminals with a max. cross-section of 1.5 mm <sup>2</sup>
Cables	Two- or three-lead + PE; fine wire, Recommended cables Olflex ® -100 or - H $\varnothing$ 3VV-F 3G1
Protection class DIN EN 60529	IP 65 plugged and tightened Important: Always fit plug with seal (scope of delivery)
Position when installed	As required
Mass (weight)	Approx. 70 g (incl. PG cable gland)
Ambient temperature	-20 ... +60°C

The amplifier is supplied as an individually packed unit. It is not pre-assembled at the plant on any proportional valve possibly ordered at the same time. Please specify valve and amplifier separately in orders.

### 2.2 Electrical data

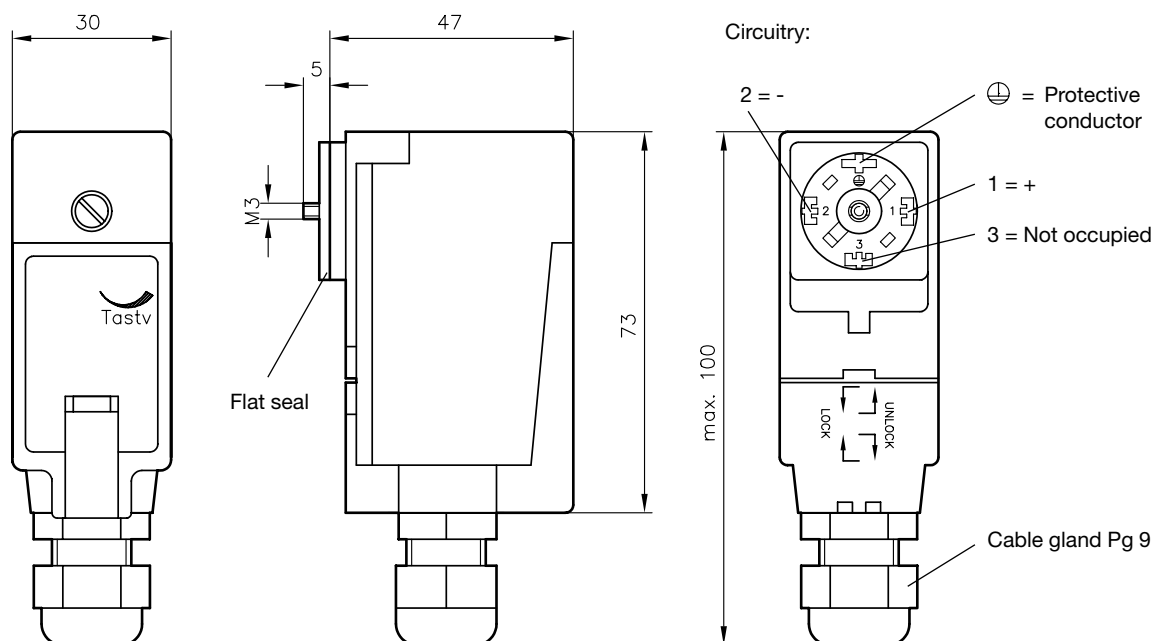
Supply voltage	$U_B$	18 ... 32 VDC; important: no pole protection
Ripple factor	w	max. 10% (make sure supply voltage is adequately smoothened)
<b>Output:</b>		
Min attraction voltage	U	$U_B - 0.8 \text{ V}$
Max attraction current	$I_A$	4 A
Max holding current	$I_H$	3 A
Attraction period	$t_{on}$	See the data provided in the pamphlet for G 24 versions applicable to the valve used
Switching time (off)	$t_{off}$	Depending on the type of valve, switch-off delay and down time may be considerably longer than specified in the corresponding pamphlet
Hold voltage <sup>1)</sup>		(0.55 ... 0.85) $U_B$ , adjustable Pre-setting 0.85 $U_B$
Switch time <sup>2)</sup>	t	Approx. 700 ms manually adjustable
Cycle frequency of PWM terminal	$f_{cyc}$	$\approx 800 \text{ Hz}$
<b>Control input <math>I_N</math>:</b>		
Control voltage	$U_N$	On 15 ... 30 VDC Off 0... 11 VDC A control voltage between 11 and 15 VDC is not allowed
Control current	$I_N$	< 15 mA
Max. permissible switching frequency		1 Hz

<sup>1)</sup> The hold voltage is the voltage applied to the valve solenoid while in operation

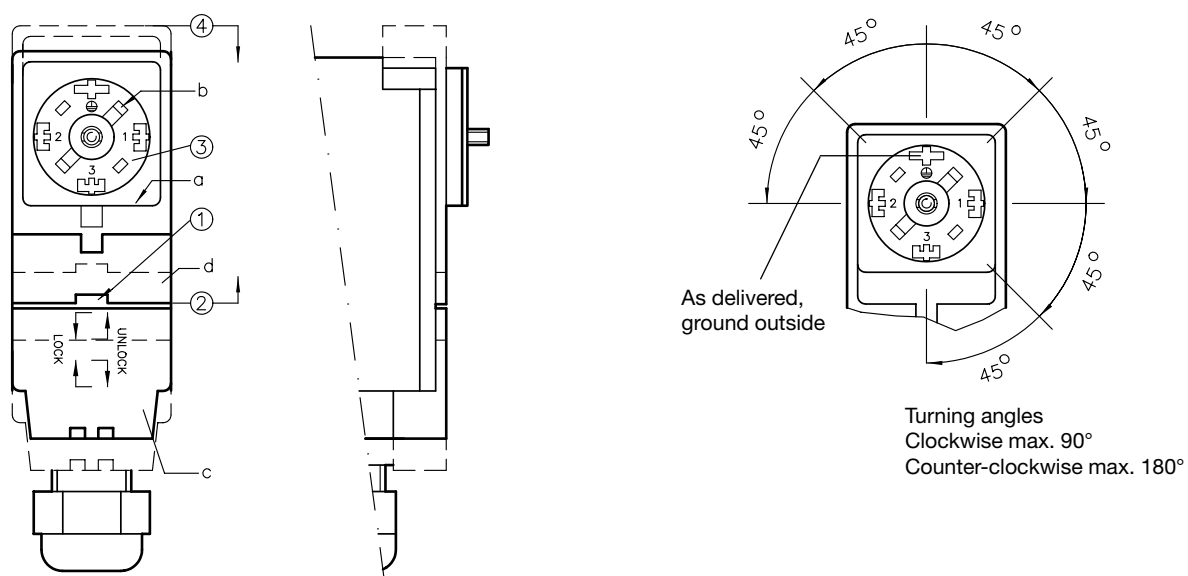
<sup>2)</sup> Switch-over time is the delay between activation and switch over to economy voltage

### 3. Dimensions

All dimensions are in mm, subject to change without notice!



Contact plate turned  
Connection pattern acc. to DIN EN 175301-803 form A  
(DIN 43 650 form A)

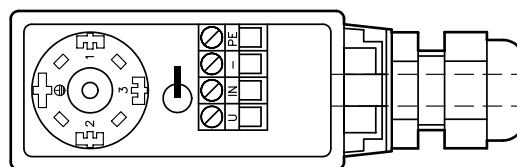


- ① Insert tip of screwdriver into partition and turn.
- ② Move bottom section to stop a, holding bottom plate c in the process.
- ③ Turn contact plate to desired position (working in 45° increments), for example by inserting a coin in slot b. You will clearly feel the 45° increments.
- ④ Push bottom section back to its original position.

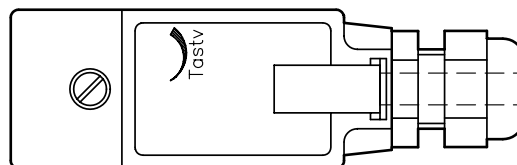
## 4. Instructions for assembly and setting

Note: Do not pull the plug while under load! The supply voltage unit (connection U) is not protected against incorrect pole connection. Down-time of a valve maybe extended considerably by using the economy circuit (due to the effect of the built-in clamp diode).

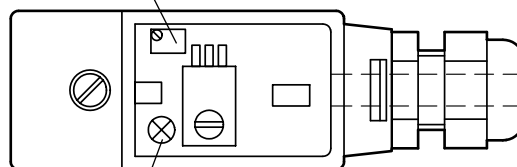
1. Connection of socket  
Connect socket via adapter to solenoid coil. Then connect voltmeter in parallel to the solenoid coil via the adapter (in this way obtaining an indication of the economy voltage). Connect control cable on the supply side in accordance with the typical switch mode shown in section 5 below.
2. After the start-up period of  $\approx 700$  ms max. voltage on the coil will drop to economy level.
3. The lowest economy voltage permissible depends on the type of valve, operation pressure, volume flow, and ambient temperature. Please inquire in the event of any unclarity regarding the economy voltage to be chosen.  
When determining the permissible economy voltage directly in the system by trial and error, conduct all tests with the solenoid coil at normal operating temperature and at the highest ambient temperature to be expected.
4. Set the economy voltage determined in this way or a somewhat higher voltage by means of the multi-gear potentiometer (18 gears). The economy voltage is displayed at the voltmeter, turning the scale counter-clockwise will increase the economy voltage.
5. Remove the adapter and screw the plug with flat seal on to the valve.



Socket without bottom



Multi-gear potentiometer (18 gear) for hold voltage (Tastv)



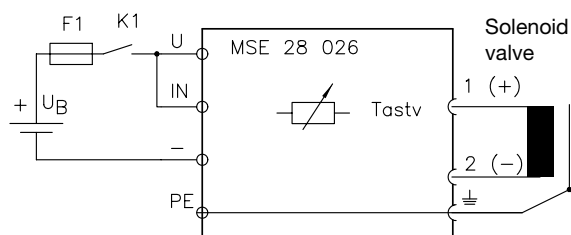
LED

Socket without transparent cover

## 5. Notes regarding assembly and setting

Example 1:

Economy circuit used on existing systems with two-lead feed wire

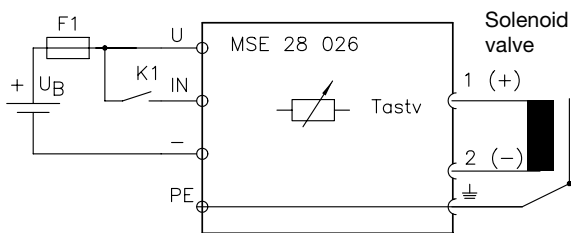


K1 = Switch contact for full coil current  
(requiring only one two-lead wire)

F1 = 3.15 A mT fine fuse

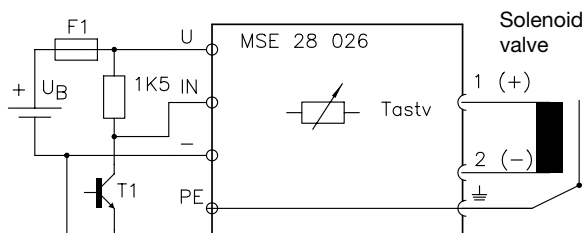
Example 2:

Economy circuit used as power amplifier with contact or semi-conductor controll



K1 = Switch contact for control current only  
(requiring a three-lead wire, advantageous with SPS)

F1 = 3.15 A mT fine fuse



T1 = Controlled by transistor at the output  
(requiring a three-lead wire, advantageous with SPS)

F1 = 3.15 A mT fine fuse