	<b>INSTRUCTION FOR INSTALLATION AND SERVICE</b>	<b>G41, G 45, G46, G 47</b>
	<b>CONTROL VALVES</b> <b>series G</b> <b>DN 40 to 300/600 PN 16 to 500</b>	PM - 038/17/05/GB

The instruction for installation are binding for users to ensure proper function of valves. The user must keep the rules mentioned in technical description TP 422-LDM-04 while servicing, installation and dismantling.

**These "instruction for installation" apply to the following valve series:**

G 41 115	Control valve, straight-through, one-seated, flanged, with extended outlet
G 45 115	Control valve, straight-through, two-seated, flanged
G 45 125	Control valve, straight-through, two-seated, weld ends
G 46 115	Control valve, straight-through, two-seated, flanged, with extended outlet
G 46 125	Control valve, straight-through, two-seated, weld ends, with extended outlet
G 47 115	Control valve, straight-through, feeding, two-seated, flanged
G 47 125	Control valve, straight-through, feeding, two-seated, weld ends
G xx xxx/A	Valves equipped with perforated throttling system

## 1. TECHNICAL DESCRIPTION AND VALVE FUNCTION

### 1.1 Description

Control valves series G are two-way valves in direct or angle design. Main parts (body, yoke bonnet) are made of cast steel or wrought steel. Inner parts (spindle, throttling element and seat) are made of quality stainless steel.

Throttling system consists of shaped control plug and seat (cage) or piston plug and control bushing, and throttling system. For G xx xxx/A consists of perforated plug and perforated cage. Individual types of throttling system are mentioned on pictures 1 to 6.

Valves' connection is executed according to ČSN standards. Some types are equipped with handwheel for emergency control.

### 1.2 Application

Control valves series G can be controlled by directly or lever-operated. Valves are designed for regulate of flow and pressure of non-aggressive liquid and gas media especially water (except of drinking water acc. to § 3 and insert n.1 notice MZ n.376/2000Sb.) and water steam for maximum working pressure up to 50 MPa and for maximum working temperature up to 550° C according to execution.

Valves are equipped with throttling system with linear or equal-percentage characteristic according to ČSN EN 60 534-1. Nominal flow volume is determined with mechanism operating parameters.

#### Leakage at seat :

- Class II. acc. to EN 1349 (<0,5% Kvs) - for valves type G 45, G 46
- Class II. acc. to EN 1349 (<1,0% Kvs) - for valves type G 47
- Class III. acc. to EN 1349 (<0,1% Kvs) - for valves type G 41

#### Differential pressures, flow velocity:

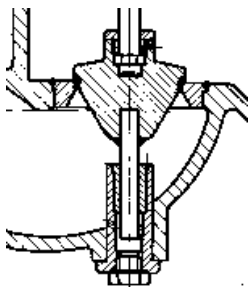
- for superheated steam it is max. 60 m/s at inlet, and max. 90 m/s at outlet when throttling orifice plates are used.
- for saturated steam it is max 45 m/s.
- for liquids, maximum differential pressure is recommended to 4,0 MPa for one step reduction and max. velocity to 3,5 m/s.
- for feeding valves type G 47 max. differential pressures are allowed to 1,5 MPa and velocity to 3,5 m/s.

### 1.3 Particularities of individual execution:

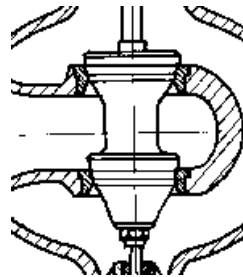
In regard of assortment of these valves is extended, some types have some particularities mostly concerning the using for different control tasks and these particularities must be highlighted:

- a) Control valves type **G 41** are used mostly for pressure reduction of steam in stepdown station with low outputs.
- b) Control valves type **G 45** are classic two-seated control valves, which can be used for higher outputs with regard to larger DN and flow areas especially for liquid media control.
- c) Control valves type **G 46** are two-seated control valves with extended outlet , they can be used for steam pressure reduction in stepdown stations with higher outputs and with regard to larger DN and flow areas.
- d) Control valves type **G 47** are used especially for feeding valves. While specifying, designer should pay especial attention to put true parameters and determine flow characteristic.

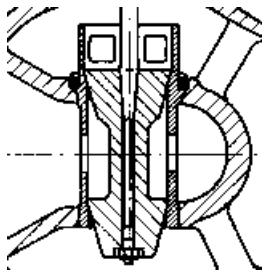
### Throttling systems:



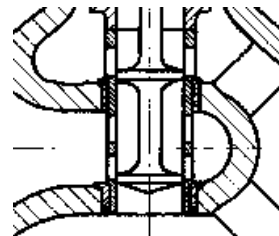
1. One-seated shaped plug ( G 41 )



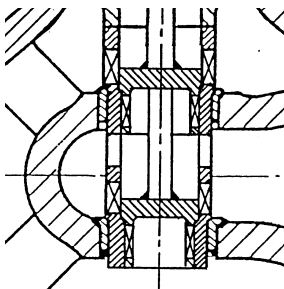
2. Two-seated shaped plug ( G 45, G 46 )



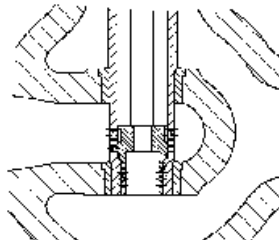
3. Two-seated shaped plug and cage ( G 45, G 46 )



4. Piston plug and control bushing ( G 47 )



5. Two-seated perforated plug and perforated cage ( G xx / A )



6. Perforated plug and perforated cage ( G xx / A )

## 2. INSTALLATION

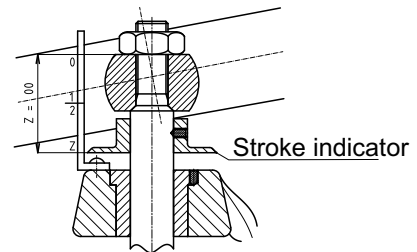
### 2.1 Preparation before installation

Before valve's installation into pipeline you must check the data on the name-plate with data mentioned in accompanying documentation. Then check if the valves are not damaged by transport.

You must take the plastic blinds and other covers or packages remove from valve and keep clean packing surface of valve's flanges as well as pipeline. Before installation must be from pipeline cleared dirt which could cause serious packing surfaces damage and loss of valve's tightness.

There are no special tools needed for installation the valve.

For valves type G 47 it is recommended to check position "Shut - Z" before installation with the aid of stroke indicator on spindle and possibly to make right setting up of the indicator (see the picture).



### 2.2 Installation the valve into pipeline

Valve can be installed only in horizontal pipeline with vertical spindle. Actuator must be above the valve body and valve must be installed into pipeline so that flow of medium is according to arrows on the body. Consult the producer if there is any other demand on installation.

Lever valves are standardly delivered with lever on the right side in the flow direction. If there is need to change the position of the lever while installation, it can be executed by moving the lever's yoke round according to your need.

For proper function of control valve, below-mentioned instructions must be obeyed:

- no excessive forces can be transferred from pipeline to valve.
- the pipeline must be cleaned from dirt before valve installation.
- the valve can not be installed just behind the bend. Pipeline should be straight min. 6xDN in front of the valve.
- it is recommended to keep clean space around the valve for easy manipulation and service.
- installation itself must be done precisely. Pipeline flanges must be coaxial with valve flanges.
- for proper function the producer recommends to install a filter of mechanic impurities into the pipeline in front of the valve.

### 2.3 Actuator's connection to electric network

These works can be done only by the experienced workers. It is necessary to keep all safety rules. It is also necessary to follow instructions for installation, operating and service of electric actuator published by producer. In regard of the valve being delivered assembled together with its actuator from the company, basic adjusting and setting of actuator is carried out. The valve is adjusted in closed position by torque switch (so that the valve will be really tight closed) meanwhile the switching off the actuator is adjusted in open position by limit switch.

In case the actuator is dismantled from the valve body for any reason such as the valve installation into pipeline etc., it is necessary to check the setting again after the assembly possibly to carry out the complete setting of actuator again. Producer does not take over the guarantee if the damage was caused by improper setting or adjusting of the actuator. In case of need, it is possible to ask for such service from service organization of the producer.

The length of the cables to actuator should be selected so that the actuator could be disassembled from the valve without any need for the cables unplugging from the actuator's terminal board.

### 2.4 Checking after installation

Piping system should be pressured after valve installation and then checked if there is no leak. Check the packing set tightness as well. Then check the proper function of actuator by doing a few strokes.

## 3. OPERATING AND SERVICE

### 3.1 Operating

If valve is placed in service it is necessary to grease the pins on control lever. If the valve is equipped with handwheel and it is placed in service with lever, the handwheel must be arrested. While operating it is necessary to observe the tightness of packing set and other joints.

### 3.2 Service

Lever mechanism must be greased repetitively during operation. If you want to change the valve's parameters possibly its flow characteristic you must contact the producer or their specialized service.

For injection and feeding valves as well as for stepdown stations which are the most strained during operation, it is recommended to carry out revision once a year, i.e. dismantling of yoke cover, check throttling system possibly change or repair the damaged parts.

In case of high leakage when closed, you must carry out revision of packing surfaces of seats and plugs, either grind in packing surfaces or change all damaged parts. Producer does not take over the guarantee for valves' proper tightness if the repair is practised without the aid of producer or the service staff.

### 3.3 Packing sets

Valves are delivered with packing set made of expanded graphite, which has long service life and good qualities. When changing the packing set or adding a ring into it, you must be careful not to damage functional surfaces on the spindle and inside the packing set. Graphite is very sensitive to any damage on the state of spindle.

### 3.4 Plugs and seats

Although, packing surfaces of plugs and seats are carefully lapped, they can be wear or damaged during operation. If you find out that you have to lap plug and seat again, you must pay attention to quality of execution especially in two-seated valves. It is recommended to change whole plug and seat if it is seriously damaged.

Pay attention to executing this for feeding valves and especially during lapping the control bushing into valve body. We recommend to change whole set of throttling system.

### 3.5 Actuators

Electric actuators have to be operated according to instructions given in „ Actuator manual “. In case of malfunction of actuator, see the instructions or ask for professional repair man.

### 3.6 Elimination of defects and malfunctions

DEFECT	ELIMINATION
Leakage of packing set	Check the state of spindle surface, tighten the packing set screws and either add a packing ring or change whole packing set, possibly spindle.
Leakage at seat increased. Valve cannot be closed.	Check if the valve is not operated with higher differential pressure than is allowed.
	Check the actuator function and its sufficient thrust.
	Check the seating sealing surfaces, lap the seat and plug, possibly change all parts of throttling system.
	Check if there are not any undesired bodies.
Adjusting of closed position is not possible (for valves G47) by reason of loosing and dropping of closed position indicator.	Dismantling the yoke and measure step of control bushing and transfer the dimension back on the piston. In case of more serious troubles contact the service staff.
Enormous noisiness increased.	Enormous noisiness increase can be caused especially by either exceeding operating parameters mentioned on the label or by presence of undesired body in valve's throttling system. It is necessary to check the state and consult the producer.

### 3.7 Spare parts

There is no need for valves series G 45, which are used in common control circuits, to order spare parts for in advance because of their long service life.

For valves series G 41, G 46 and G 47 it is recommended to order the spare parts for three-years-service-life:

-1 set spindle, plug and cage

-1 set spindle, piston and control bushing

When ordering it is **necessary** to mention registration valve's number written either on the label fixed on the lever (lever valves) or on outlet flange or adjutage.

### 3.8 Guarantee conditions

The producer does not guarantee the product operation and safety if the product was used in other way than stipulated in this instructions for installation and service and catalogue data sheet. Any use of the product under different conditions must be consulted with the producer.

The producer does not take over the guarantee if the user makes any change or modification to it without prior written consent from the producer (except the gland bolt tightening).

### 3.9 Loading with wastes

Packaging material and the valves shall be disposed of in the common way such as by handing over to a specialized enterprise for disposal of (body and metal parts - metal waste, other non-metal parts - communal waste).

### Accompanied documentation

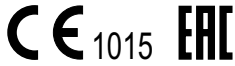
TP 422-LDM-04 Control, starting, feeding valves. Technical code.

ČSN 13 3060 Industrial valves. Technical delivery code. Part 1, 2, 3, 4.

ČSN EN 60 534-1 Industrial valves. Flow characteristic.

### Maximum permissible working pressure according to EN 12516-1[MPa]

Material	PN	Temperature [ °C ]									
		100	150	200	250	300	350	400	450	500	550
Cast steel 1.0619	16	1.50	1.42	1.34	1.23	1.11	1.04	0.96	0.59	---	---
	25	2.34	2.22	2.10	1.92	1.74	1.62	1.50	0.92	---	---
	40	3.74	3.55	3.36	3.07	2.78	2.59	2.40	1.47	---	---
	63	5.90	5.59	5.29	4.84	4.38	4.08	3.78	2.32	---	---
	100	9.36	8.88	8.40	7.68	6.96	6.48	6.00	3.68	---	---
	160	14.98	14.21	13.45	12.29	11.14	10.37	9.60	5.89	---	---
	250	23.41	22.21	21.01	19.21	17.41	16.20	15.00	9.20	---	---
	320	29.97	28.43	26.89	24.59	22.28	20.75	19.21	11.78	---	---
	400	37.45	32.53	33.61	30.73	27.85	25.93	24.01	14.73	---	---
Alloy steel 1.7357	16	1.60	1.60	1.60	1.60	1.60	1.49	1.37	1.26	1.00	0.47
	25	2.20	2.50	2.50	2.50	2.50	2.33	2.13	1.97	1.56	0.73
	40	4.00	4.00	4.00	4.00	4.00	3.73	3.41	3.15	2.50	1.17
	63	6.30	6.30	6.30	6.30	6.30	5.87	5.37	4.97	3.93	1.85
	100	10.00	10.00	10.00	10.00	10.00	9.31	8.53	7.89	6.24	2.93
	160	16.00	16.00	16.00	16.00	16.00	14.91	13.66	12.62	9.99	4.70
	250	25.00	25.00	25.00	25.00	25.00	23.29	21.34	19.72	15.60	7.34
	320	32.00	32.00	32.00	32.00	32.00	29.81	27.32	25.25	19.98	9.39
	400	40.00	40.00	40.00	40.00	40.00	37.26	34.14	31.56	24.97	11.74
500	50.00	50.00	50.00	50.00	50.00	46.55	42.65	39.45	31.20	14.65	



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