

Data Sheet

# Transmission Module

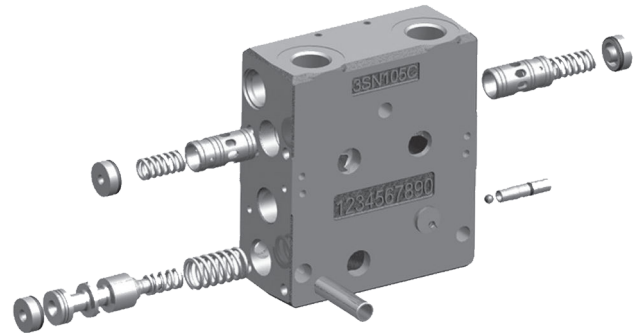
## PVBM

### Meter-In Meter-Out – Open Circuit Transmission

The Meter-in Meter-out module is designed primarily for use with transmission hydraulic motors in e.g. manlifts or demanding winch applications. The terms Meter-In and Meter- Out relates to the oil flow being metered into (Meter-In) and out from (Meter-Out) the transmission motor by the PVG valve.

With the Meter-in Meter-out module both flows in and out of the transmission motors are controlled at the same time.

The Meter-in Meter-out module will ensure a stable, well controlled movement of application when motor is pushing (i.e. upwards hill) or motor being pulled (i.e. downward hill) or horizontal movement.



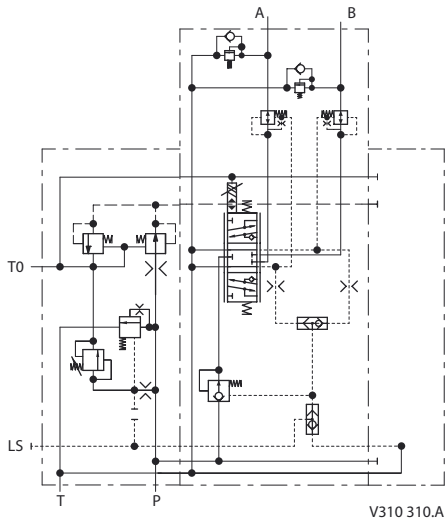
### Features

- Integrated shock/anti-cavitation valve (A- and B- port)
- T0 connection
- BSP/UNF
- Meter-In compensator
- Meter-Out compensator on A- and B- port
- Increased control of negative loads



Comprehensive technical literature online  
at [powersolutions.danfoss.com](http://powersolutions.danfoss.com)

**Schematic**



*Available spools*

Flow Characteristic	Function in Neutral	Flow l/min (Symmetrical)	Part Number
Progressive	Closed neutral	5	11187198
		10	11185988
		25	11186235
		40	11186436
		65	11186450
		100	11156265
Linear	Closed neutral	130	11156268
		10	11187177
		25	11187390
		40	11187500
		65	11187659
		100	11156300

*Available modules*

Description	BSP G1/2 ports Code No.	SAE 7/8-14 ports Code No.
PVBM module	157B6268	11018399

**Application Awareness**

- With the Meter-In Meter-Out module, stability is determined by ensuring that oil flow into the system is always lower than oil flow out of the system. This is achieved by means of different spring settings in the Meter-In Meter-Out compensators. As an example, this means that a motor will run faster in Meter-Out mode than in Meter-In mode.
- Due to the Meter-out compensators, a backpressure valve is needed to avoid cavitations when running in meter-out situations. The back pressure setting would be application dependent but typical values are between 5-10 bar. Increased back pressure setting ensures better protection against cavitations but also decrease energy efficiencies. The hydraulic system would be leaking in neutral when external forces acts on the working ports. To avoid unwanted movements of the applied motors, therefore external brakes are needed.
- Dependent on the application type smooth movement could be requested. PVE's in combination with a controller and joystick could be useful to add ramps on the spool and delay on the motor brakes so it doesn't hit the brakes too hard when returning to neutral.

**Transmission Module PVBM**

*Technical specifications*

Max. pressure	Port P continuous, Port A/B	350 bar [5076 psi]
	Port T static/dynamic	25/40 bar [362/580 psi]
	Port A/B and P	130 l/min [34 US gal/min]
Oil flow, rated	Port A/B and P	130 l/min [34 US gal/min]
Spool travel		±7 mm [±0.28 in]
Max. internal leakage A/B→T at 100 bar [1450 psi] and 21 mm <sup>2</sup> /s		1 l/min [61 in <sup>3</sup> /min]
Max. internal leakage A/B→T at 200 bar [2900 psi] and 21 mm <sup>2</sup> /s		1.5 l/min [92 in <sup>3</sup> /min]
Oil temperature (inlet)	Recommended	30 → 60 °C [86 → 140 °F]
	Minimum	-30 °C [-22 °F]
	Maximum	90 °C [194 °F]
Ambient temperature		-30 → 60 °C [-22 → 140 °F]
Oil viscosity	Operating range	12-75 mm <sup>2</sup> /s [65-347 SUS]
	Minimum	4 mm <sup>2</sup> /s [39 SUS]
	Maximum	460 mm <sup>2</sup> /s [2128 SUS]
Filtration, max. contamination (ISO 4406)		18/16/13

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