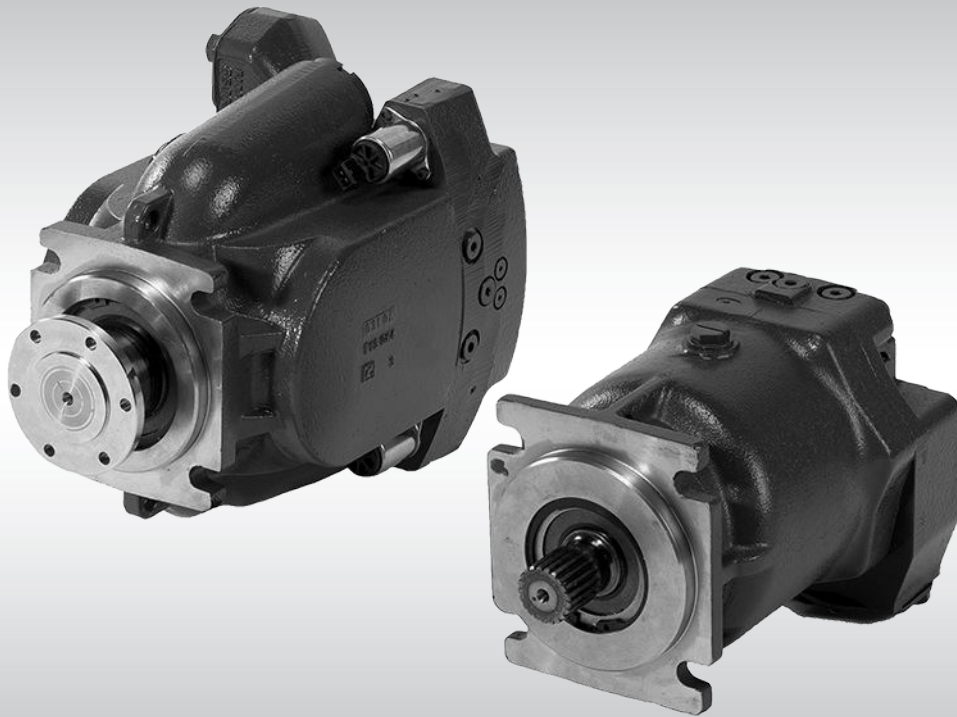




System Description

# Transit Mixer Drives System Series TM



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**System Description**      **Series TM Transit Mixer Drive System**

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**Revision History***Table of Revisions*

<b>Date</b>	<b>Changed</b>	<b>Rev</b>
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## Transit Mixer Drive System TM

### General

The new Transit Mixer Drive System -TM for short - from Danfoss is based on more than 30 years' experience in the worldwide use of drum drive systems in transit mixers. Innovative electronics suitable for mobile use, combined with reliable technology, are the result of this development.

Danfoss offers, as a single supplier, complete systems for drum sizes from **6-12 m<sup>3</sup>** [8-16 yd<sup>3</sup>] from one source.

The smart system resets the standard relating to the market requirements for reliability and simple handling.

### Product Features

- Hydrostatic transmission
  - overall size 070 and 089 cm<sup>3</sup> [4.3 and 5.4 in<sup>3</sup>]
  - electrical proportional control of the pump
  - rotational group proven over millions in units
  - noise reduction by 12 dB (A)
  - exemplary reductions in overall volume and weight
- Operating units
  - external and cab-mounted station
  - simple installation and wiring
  - electric plug connections suitable for mobile use
  - no adjustments, "Plug and Perform"
- Mixer gearbox
  - overall size 51.2, 61.2 and 71.2
  - with/without water-pump drive
  - speed sensor receiving bore as standard
  - Speed sensor retrofittable without adjustment
  - no adjustments "Plug and Perform"

### System Features

- direction of rotation and speed via latched rotary switch on the cab-mounted or external station
- identical operating elements on the cab-mounted and external stations
- external station pushbutton: STOP/START the drum
- external station pushbutton: STOP/START the drum with the cab-mounted station active
- cab-mounted station pushbutton: change over to external station and vice versa
- status reporting from the cab-mounted and external stations via LEDs
- active cab-mounted station during transit means the external station is switched off
- constant drum speed with variable pump-drive speed
- constant drum speed, irrespective of the loading of the drum
- exact repeatability of the drum speed by means of a latched rotary switch
- automatic maximum drum-speed limitation

A convincing, reliable and smart system solution from Danfoss which (at present) is still missing from your transit mixer?

Contact us! Our worldwide sales organization is ready to serve you.

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**System Description      Series TM Transit Mixer Drive System**


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**Transit Mixer Pump/TMP and Motor/TMM**
**General**

The hydrostatic transmission developed by Danfoss for transit mixers, comprising the axial piston variable displacement pump TMP and the axial piston fixed displacement motor TMM, is based on more than 30 years' experience in the world wide use of pumps/motors in transit mixers.

The demonstrable reliability of the rotational group was decisive in continuing to use these in the new and innovative drive concept.

In the TMP and TMM the connection sizes (fixing flange/shaft) from series 20 were adopted. The TMP shaft is designed at the factory with the usual DIN connection flange Ø 100 mm as standard.

The requirements of the market with regard to reducing the overall volume, weight and noise, and also the electrical pump displacement control - in connection with the introduction of trucks with EURO 2 (3) diesel engines - have been taken into account accordingly.

**Features**

**All hydraulic connections have metric threads.**

*Transit Mixer Pump 070 or 89 cm<sup>3</sup> [4.3 or 5.4 in<sup>3</sup>]*

*Transit Mixer Motor 070 or 089 cm<sup>3</sup> [4.3 or 5.4 in<sup>3</sup>]*



- Electrical displacement control (12 or 24 VDC)
- operating, suction and leakage oil connections on one side
- measurement connections on the rear
- integrated charge pump (20 cm<sup>3</sup>) [1.2 in<sup>3</sup>]
- integrated high-pressure relief valves (420 bar) [6 000 psi]
- Ø 100 mm-drive flange (DIN/ISO) as standard

**Option:**

- through-drive SAE "A"
- splined shaft

- operating connections on one side
- integrated loop flushing device
- high-pressure measurement
- connections on one side

**Option:**

- speed sensor

**Transit Mixer Pump/TMP and Motor/TMM**

**Functional Description**

In accordance with the rotary switch position on the TME operating unit, a current set point is generated and connected to the electrical proportional valve of the TMP as a PWM signal. The necessary control oil supply is provided by the feed circuit of the charge pump and is delivered to the actuating cylinder via the electrical proportional valve. Depending on the current value, a proportional actuating pressure is established on the actuating cylinder, and therefore a stroke, which adjusts the swash plate and defines the geometric delivery volume of the pump.

Depending on the drive speed of the pump, a pump delivery flow is established which determines the output speed of the motor or the input speed to the TMG mixer gearbox.

Since the pre-selected drum speed is intended to be kept constant, irrespective of the variable diesel/pump drive speed or charging state a speed control system has been implemented.

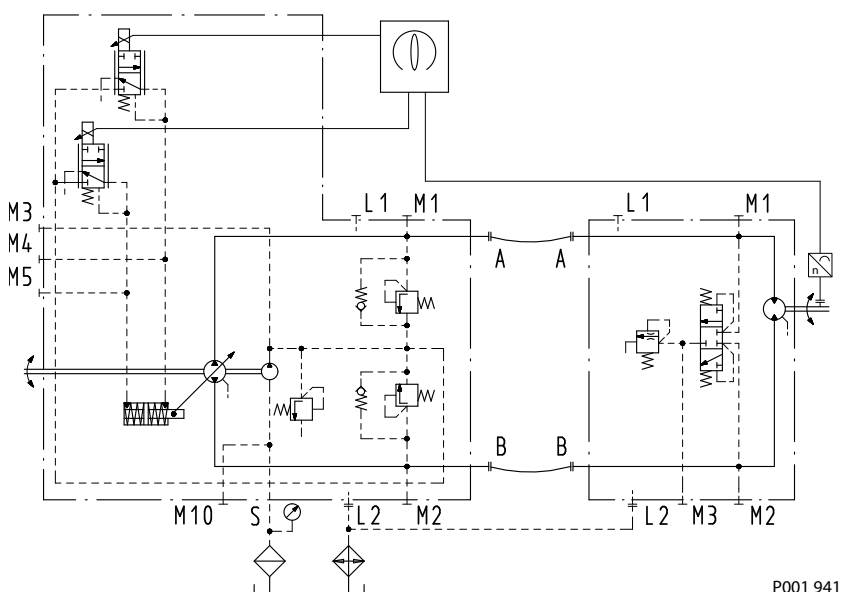
In order to meet the demand for a constant drum speed the actual value is detected via the speed sensor in the TMG gearbox and provided as an input signal to the TME operating unit. The electronics compare the actual value with the pre-selected set point of the drum speed and can re-adjust the current value for the electrical proportional valves and therefore the geometric delivery volume of the TMP until the two agree, that is to say the pump delivery flow is kept constant.

**The system presented completely meets the demand for a constant drum speed in accordance with the pre-selection on the rotary switch of the TME operating unit.**

The integrated charge pump supplies the closed circuit via 2 multi-function valves - feed and high-pressure protection - on the respective low-pressure side, using cooled and filtered oil. The integrated flushing device in the motor, comprising an alternating slide and permanently set nozzle flushing valve, ensures a defined exchange of oil in the closed circuit. The oil led via the cooler is fed in again via the charge pump by means of a suction filtering system connected upstream.

At the time of first commissioning rapid air separation from the high-pressure circuit is also achieved by the flushing device and, in addition, it is ensured that unavoidable "installation dirt" is flushed out at the same time and can be picked up by the suction filtering system.

**Hydraulic Circuit Diagram**



P001 941

**Transit Mixer Electronic Unit TME**
**General**

The Transit Mixer Electronic Unit -TME for short - constitutes a ready-to-install operating unit for the Danfoss drum drive system for transit mixers and is available as an external and cab-mounted operating unit.

Both operating units are designed as build-in modules and completely encapsulated. The electrical lines are produced in an operationally reliable way via mechanically locked AMP plug-connector systems suitable for mobile use.

The operating units are in each case fixed into the specific housing of the transit mixer manufacturer via (2) fastening angles in each case forming part of the scope of supply. The flat seal also supplied effectively prevents dirt and water penetration if the installation instructions are complied with.

The cab-mounted operating unit is an additional device and can be operated only in conjunction with the external operating unit.

The qualification tests with regard to EMC and ESD resistance, vibration, shock and temperature and also salt-spray testing were passed successfully.

The simple wiring and installation - no adjustments - are features of this smart solution.

"Plug and Perform<sup>®</sup>", the Danfoss concept

**Functional description**

Using the rotary switch on the operating unit, the direction and speed of rotation of the drum are pre-selected and, corresponding to the position of the rotary switch, a current value is supplied to the electrical pump control. The pump delivery current which is established determines the reference motor speed at the input of the mechanical gearbox. The speed sensor in the mixer gearbox registers the actual speed as a feedback variable for the electronics. The desired and actual values are compared and readjusted until both values agree, that is to say for the transit mixer, drum speed control in any selected position.



Using the central rotary switch, the direction of rotation and speed are pre-selected.

- Charging/Transport : 3 positions (2-10-14 rev/min)/ to the right of the LED
- Neutral/Stop : 1 position (0 rev/min) corresponding to the position of the LED
- Discharging : 7 positions (1-2-4-6-8-10-14 rev/min)/ to the left of the LED

The yellow pushbutton on the external operating station permits the drum to be stopped/started from a pre-selected direction of rotation and speed. The LED signals the status of the operating unit.

- press briefly : the drum stops /LED flashes
- press again : the drum starts /LED lights up

The yellow pushbutton on the cab-mounted operating station permits a changeover to the external operating station and vice versa. The LED indicates the status of the operating unit.

- press briefly : cab unit switched on/LED lights up - external switched off /LED off
- press again : cab switched off /LED off - external in "stand by"/LED flashes

**Transit Mixer Electronic Unit TME**

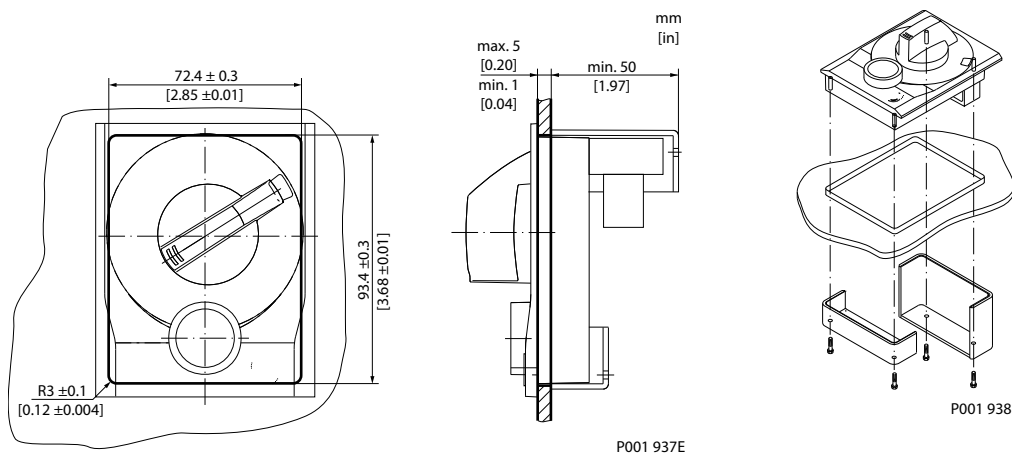
When the cab-mounted operating station is active, the yellow pushbutton on the external operating station can likewise be used to stop/start the drum, e.g. EMERGENCY STOP or for pouring foundations for kerbstones.

- press briefly : stop the drum/cabin LED flashes
- press again : start the drum/cab LED lights up

A transfer of functions from the cab to the external operating station is signalled by the flashing LED on the external operating station in the "stand by" operating mode

- set the rotary switch to neutral
- press the yellow pushbutton briefly, this means : LED lights up and station is switched on

**Installation space**



In order to accommodate the TME in the customer-specific housing, it is merely necessary to produce a cut-out having the dimensions illustrated above. The housing wall thickness must not be less than **1.0 mm** [0.04 in] or more than **5.0 mm** [0.20 in].

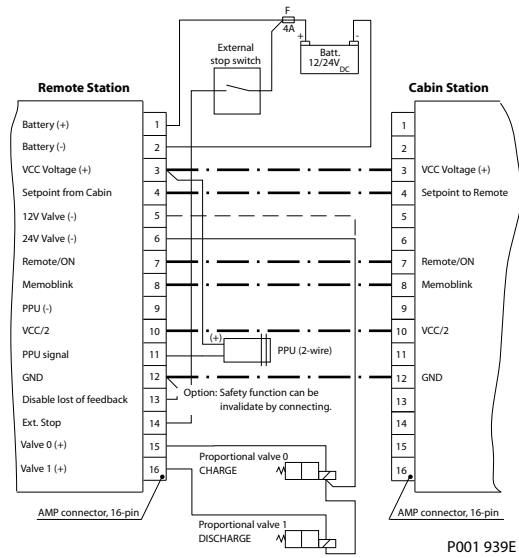
The minimum installation depth is **50.0 mm** [1.97 in]. Fixing/clamping in the customer-specific housing is carried out via the (2) fixing angles, using (2) screws in each case and forms part of the scope of supply of the TME.



**System Description      Series TM Transit Mixer Drive System**

**Transit Mixer Electronic Unit TME**

**Wiring diagram**



By connecting the pins of the TME appropriately, the operating units can be operated with 12 or 24 V<sub>DC</sub> depending on the respectively available on-board voltage of the truck.

**Transit Mixer Gearbox TMG**
**General**

In connection with the hydrostatics developed specifically for the application with electrical pump control in the closed control loop, all the available TMGs are prepared as standard for subsequent retrofitting with a speed sensor. At the factory the receiving bore is closed by an oil-tight cover.

The new drive system presented here for Transit Mixer -TM for short - generally needs the speed sensor. Because of the design of the construction, this can be retrofitted simply. Adjustment of the speed sensor - known from other designs - is dispensed with.

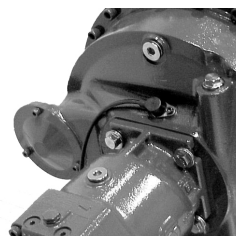
In addition product improvements as compared with the mixer gearboxes of the HPM series have been included in series production.

Since the mixer gearbox constitutes part of the overall TM system, the same designation logic applies as that used in the other products specific to an application, that is to say Transit Mixer Gearbox - TMG for short - plus the further type designation known from the HPM series.

Three overall sizes - 51.2/ 61.2/ 71.2 - can be supplied both without and with the connection option for a water pump - optionally on the right or left.

*Size 61.2 with water-pump connection and speed sensor*

*Speed sensor*



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**System Description      Series TM Transit Mixer Drive System**


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**Transit Mixer System**
**General**

Depending on the drum size, the following products can be supplied as a system solution as standard.

**6 - 8 m<sup>3</sup>** [8-10 yd<sup>3</sup>] TMP070-TMM070-TMG51.2/i=103 TMG optionally without/with water-pump drive

**8 - 10 m<sup>3</sup>** [10-13 yd<sup>3</sup>] TMP089-TMM089-TMG61.2/i=112 TMG optionally without/with water-pump drive

**10 - 12 m<sup>3</sup>** [13-16 yd<sup>3</sup>] TMP089-TMM089-TMG71.2/i=131 TMG optionally without/with water-pump drive

Irrespective of the drum size the following products complete the system solution.

- TME remote operating station
- TME cab-mounted operating station
- speed sensor, complete

**Optional**

- mating connector for the TME operating station
- mating connector for the proport. valves of the variable displacement pump TMP

**Available outline drawings**
*Outline Drawings*

<b>Series</b>	<b>Ident. No.</b>
TMP070/089	513 076
TMM070/089	520 118
TMG 51.2	443 879
TMG 61.2	480 814
TMG 71.2	445 981



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Local address:

**Danfoss Power Solutions US Company**  
2800 East 13th Street  
Ames, IA 50010, USA  
Phone: +1 515 239 6000

**Danfoss Power Solutions GmbH & Co. OHG**  
Krokamp 35  
D-24539 Neumünster, Germany  
Phone: +49 4321 871 0

**Danfoss Power Solutions ApS**  
Nordborgvej 81  
DK-6430 Nordborg, Denmark  
Phone: +45 7488 2222

**Danfoss Power Solutions (Shanghai) Co. Ltd.**  
Building #22, No. 1000 Jin Hai Rd  
Jin Qiao, Pudong New District  
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