SECTION 4

Power take offs

Page

4.1 General Specifications

Different types of power takeoffs can be used dependine on the type of use and the performances required, the the PTO can be fitted to:

- The gearbox.
- Driveline.
- The front of the engine.
- The rear of the engine.

The characteristics and performances are given in the paragraphs which follow and in the relevant documentation which will be supplied upon request.

For the definition of the power necessary for the apparatus to be controlled, particularly when the values requested are high, the absorbed power should also be considered during the drive transmission phase (5 to 10% for the mechanical transmissions, belts and gears, and greater values for the hydraulic controls).

The choice of transmission ratio for the power take-off should be made so that the absorption of power occurs in a flexible engine operating range. Low r.p.m. (below 1,000 r .p.m.) must be avoided to prevent irregular running .

The power taken in relation to the number of revolutions of the power take-off at the required torque.

$$P(CV) = \frac{M \cdot n}{7023} \qquad P(kW) = \frac{M \cdot n}{9550}$$

P = Useable power
M = Torque permitted for the power take-off (Nm)
n = power take-off r.p.m.

Type of use

Both occasional and continuous use should be considered.

For occasional use periods of under 30 minutes are considered.

The values for continuous use are those used for long periods. Whenever this is comparable to that of a stationary engine, the suitability of reducing the scheduled values on the basis of the conditions of use (engine cooling, gearbox etc.) should be evaluated.

The scheduled take-off values are also applicable for uses which do not involve large variations of torque either in frequency or magnitude.

To avoid overloading, in some cases (e.g. hydraulic pumps, compressors) it may be necessary to include the application of devices like clutches or safety valves.

PTO transmissions

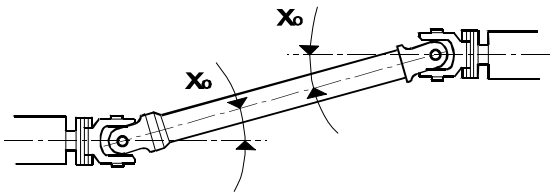
The kinematic forces of the transmission from the power take-off to the relevant apparatus should be carefully considered (angles, r.p.m., moment) during the design phase and the dynamic behaviour during operation in compliance with the transmission Manufacturer's instructions should be respected. The dimensions should take into consideration the forces which might occur under maximum power and torque conditions.

To obtain a uniformity of kinetic forces angles of equal value, maximum of 7°, should be obtained at the extremities (Figure 4.1) . Solution Z is preferred to solution W due to the lower loads on the bearings of the power take-off and the equipment being driven. When it is necessary to obtain different spatial inclinations (φ), the variations in r.p.m. should be compensated for with the arrangement of the forks shown in Figure 4.2.

For transmissions employing multiple sections, the instructions given at point 2.8.2 should be followed.

Figure 4.1

Solution Z



Solution W

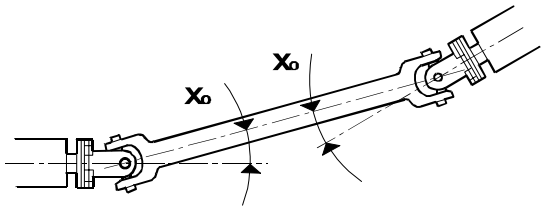


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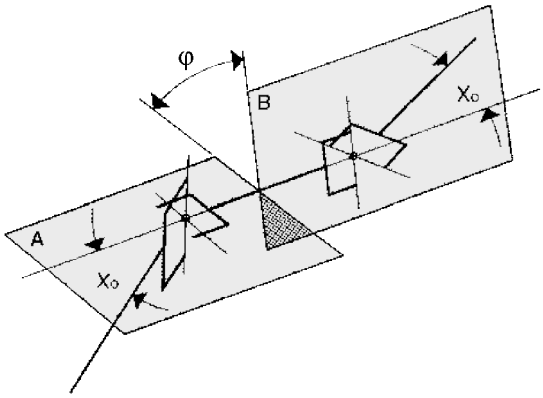
Figure 4.2



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Transmission PTO data

The following table specifies the types of P.T.O. envisaged by ZF and by Hydrocar.

The transmission P.T.O. and the Body Computer (BC) will need to be reprogrammed when a PTO is applied after-market. Interventions on the electrical and pneumatic system are required. Read paragraph 4.6 "PTO management" carefully before applying a PTO.

Re-programming of the electronic control units must be carried out in accordance with the instructions in the IVECO technical manual using exclusively the diagnostic instrument (available from IVECO dealers and authorised IVECO service centres), furnishing the information concerning the specific P.T.O. utilized.

Electrical system

The MUX system enables innovative management of the P.T.O.s with benefits in terms of safety and reliability, by means of the connection of the P.T.O. control switches to connector ST14.

Said connection is already present when the customer orders the optional P.T.O. If the P.T.O. is fitted after the vehicle is purchased follow the prescriptions given in heading 4.6

Pneumatic system

For air intake, see instructions at para 2.15.4.

4.2 Power Take-off from Gearbox

Depending on the type of gearbox power can be taken from the layshaft through the flange or spline located on the rear, side or lower part of the gearbox.

The technical characteristics necessary are given in the documentation supplied upon request for the various gearboxes.

The types of power take-off and the torque values obtained with the ratio between the number of output revolutions and engine r.p.m. are shown in Table 4.1.

The values refer to the conditions indicated in the table.

Higher values for occasional use must be agreed upon as each occasion arises depending on the type of use.

Check the vehicle to ascertain whether it is possible to fit a power take-off suitable to its size.

The power take-off applied to the gearbox must only be used when the vehicle is stationary and must be engaged and disengaged when the clutch is disengaged to avoid excessive stress on the synchronisers during gear change. For special situations when the power take-off is used and the vehicle is moving the gear must not be changed.

For gearboxes equipped with a torque converter, the same power take- offs used for normal gearboxes are, as a rule, used. It should be carefully noted that, when the engine r.p.m. is below 60% of the max. value the converter will be in the phase of hydraulic r.p.m.; in this phase, depending on the absorbed power, the r.p.m. of the power take-off is subject to oscillation despite the fact that the engine r.p.m. is constant.

Direct Application of Pumps

When the application of pumps of other equipment (e.g. for tippers or cranes) is carried out directly from the power take-off, without the use of intermediate shafts and after checking that the size of the pump permits margins of safety with chassis and engine unit (cross member, transmission shaft etc.), the static and dynamic torques exerted by the mass of the pump and by the power take-off should be checked for compatibility with the resistance of the walls of the gearbox. By way of an example, the moment due to the additional masses must not have values of over 3% approx. of the maximum engine torque.

In cases where the gearbox is applied in a single unit with the engine, the value of the additional masses must be verified with regard to the inertial effects in order to avoid the induction of resonance conditions in the engine unit within the field of operational engine r.p.m.

When fitting power take-offs the torque values shown in Table 4.1 must not be exceeded.

Transmission oil temperature must not exceed 120°C during prolonged use. Coolant temperature must not exceed 100°C. Not all types of power take-off available on the market are suitable for continuous use. When in use the specifications (working periods, pauses etc.) specific to the power take-off in question should be respected.

Table 4.1 - PTO types provided by ZF and Hydrocar

Trasmission	N. opt.	Type P.T.O.	Assembly side	Ratio Total P.T.O.		Maximum take-off torque (Nm)
9S1310 TO	5202	ZF -NH/1b	center	0.97		800
	5205	ZF -NH/1c	center	0.97		800
	5209	ZF -NH/4b	lower	1.24		430 (1)
	5210	ZF -NH/4c	lower	1.24		430 (1)
	5258	ZF -N109/10b	high	1.45		530
	5255	ZF -N109/10c	high	1.19		630
	5259	ZF -N109/10c	high	1.45		530
16 S 1620 TD 16 S 1920 TD 16 S 2220 TD 16 S 2320 TD				**normal**	**Overmultiplied**	
	5202	ZF -NH/1b	center	0.91	0,77	1000
	5205	ZF -NH/1c	center	0.91	0,77	1000
	5209	ZF -NH/4b	right	1.17	0,98	430 (1)
	5210	ZF -NH/4c	right	1.17	0,98	430(1)
	5258	ZF -N221 10/B	above	1.35	1,14	730
	5260	ZF -N221 10/B	above	1.75	1,47	560
	5264	ZF -N221 10/B	above	2.00	1,68	470
	5255	ZF -N221 10/C	above	1.13	0,95	870
	5259	ZF -N221 10/C	above	1.35	1,14	730
	5255	ZF -N221/10C-PL	above	1.13	0,95	870
16 S 2220 TO 16 S 2520 TO				**normal**	**Overmultiplied**	
	5202	ZF -NH/1b	center	1.09	0,91	1000
	5205	ZF -NH/1c	center	1.09	0,91	1000
	5209	ZF -NH/4b	right	1.40	1,17	430 (1)
	5210	ZF -NH/4c	right	1.40	1,17	430 (1)
	5258	ZF -N221 10/B	above	1.62	1,35	730
	5260	ZF -N221 10/B	above	2.09	1,75	560
	5264	ZF -N221 10/B	above	2.40	2,00	470
	5255	ZF -N221 10/C	above	1.35	1,13	870
	5259	ZF -N221 10/C	above	1.62	1,35	730
	5255	ZF -N221/10C-PL	above	1.35	1,13	870
12 AS 1420 TD	5202	ZF -NH/1b	center	0,80/0,99		800
	5205	ZF -NH/1C	center	0,80/0,99		800
	5209	ZF -NH/4b	lower	1,02/1,27		430
	5210	ZF -NH/4c	lower	1,02/1,27		430
	5260	ZF -Nm AS/10 b	above	1,53/1,89		430 (1)

Table 4.1 - (continued) PTO types provided by ZF and Hydrocar

Trasmission	N. opt.	Type P.T.O.	Assembly side	Ratio Total P.T.O.		Maximum take-off torque (Nm)
12 AS 1930 TD 12 AS 2330 TD	5202	ZF -NH/1b	center	0.82		1000
	5209	ZF -NH/4b	right	1.05		430 (1)
	5210	ZF -NH/4c	above /H	1.05		430 (1)
	5260	ZF N AS/10b flange	above /H	1.92		400
	6420	ZF -Nm AS/10b double output	above/L/pump lower/H/flange	1.21		670
				1.92		400
12 AS 2330 TD 12 AS 2530 TD	5202	ZF -NH/1b	center	1.35		1000
	5209	ZF -NH/4b	right	1.22		430 (1)
	5210	ZF -NH/4c	above /H	1.22		430 (1)
	5260	ZF N AS/10b flange	above /H	2.15		400
	6420	ZF -Nm AS/10b double output	above/L/pump lower/H/flange	1.23		670
				1.73		400

1) Limit 1h

4.3 Power Take-off from Transfer Box

In vehicles with all wheel drive (4x4) the application of power take- offs on the transfer box is possible. The r.p.m. for this use may be chosen on the basis of the most suitable gear.

Use is permitted only when the vehicle is stationary (transfer box in neutral). The specification regarding the correct use are given in the Owner's Manual supplied with the vehicle.

The available take-off values are given below:

Table 4.2

Power take-off		
Transfer box type	**Max. torque (Nm)**	**Output type**
	Output	
TC 1800 (1)	1180	Flange Ø ext. dia. 120 mm 8 holes dia. Ø 10 mm; or direct pumps coupling
TC 2200 (1)	1180	

(1) When the optional Power Take Off is required, detailed internal changes to the Transfer Box have to be made, therefore contact Sales Engineering for further information.

For further information contact IVECO S.p.A., Technical Application,
Strada delle Cascinette 424/34, 10156 Torino
(E-mail: thbiveco@iveco.com).

4.4 Power Take-off from Drive line

The authorisation for the application of a power take-off on the drive line downstream of the gearbox is issued after examination of the complete documentation presented to the Company.

The various power and torque values will be evaluated as each occasion arises on the basis of the conditions of use.

In general the following should be noted:

- The drive take-off may be operated only when the vehicle is stationary.
- The power take-off r.p.m. is dependent on the gear selected.
- The power take-off must be located immediately downstream of the gearbox. For vehicles with the drive line in two or more sections, the power take-off may also be fitted at the flexible support included between the first and second sections (respect the indications given in point 2.8.2).
- The angles of the drive line on the horizontal plane and vertical plane must be kept as close as possible to the original values.
- Masses and rigidity added to the drive line must not provoke a loss of balance or abnormal vibrations or damage the transmission drive line (from engine to axle) either during vehicle movement or during operation with the motor running.
- The power take-off must be fixed to the chassis with its own suspension.

NOTE As the transmission is an important part for the safety of the vehicle, modification to it must only be carried out by specialist companies approved by the supplier of the transmission.

4.5 Power Take-off from Engine

In general the use of these power take-offs is planned for apparatus requiring a continuous power supply.

4.5.1 Torque power take off from the front of the engine

The drive take-off from the front part of the crankshaft is obtained, for limited power values to be drawn off (e.g. air conditioning etc.) by drive belt transmission, the use of coupling shafts is normally reserved for take-offs of a greater magnitude (e.g. municipal use).

These uses, when not specifically planned, require precise modifications to the front part of the vehicle, e.g. modifications to the radiator, cab, bumpers etc. Particular attention must therefore be paid:

- To the system comprising additional masses and relative rigidity which must be flexibly disengaged from the crankshaft with regard to the torsional and flexional effects.
- To the additional mass values and relative moments of inertia and to the distance from the centre of gravity of the masses from the centreline of the first main bearing which must be kept to a minimum.
- To avoiding a reduction in the radiator cooling capacity and dead water areas.
- To restoring the rigidity and resistance characteristics of the modified elements (cross member, bumper etc.).
- To avoid exceeding, during extended use, temperatures of the engine cooling fluid of over 100°C and engine oil temperature (measured on the main duct of the pressure switch area) of 110 to 120°C. A margin of approx. 10% should however be left. In other cases include supplementary heat exchangers.

Table 4.3 shows the values to be referred to for the take-off.

Table 4.3 - Power take-off from front of engine

Engine type (power)	Rpm corresp. to full power		Max. rpm admitted (start of red band)		Max. take-off values				
					Max. torque available	Max. moment of inertia	Max. bending moment	Moment multipl. factor	Multipl. factor ang. pos.
(kW/Cv)	rad/s	(rpm)	rad/s	(rpm)	(Nm)	(kgm^2)[1]	(Nm)[2]	(-)[3]	(degrees)[4]
Serie Cursor 8 - F2B									
E0681C (200/273)	251	2400	324	3100	400	0.050	120	2	180-210
E0681B (229/310)	251	2400	324	3100	400	0.050	120	3	210-240
E0681A (259/352)	251	2400	324	3100	400	0.050	120	4	240-300
								3	300-330
								2	330-360
Serie Cursor 13 - F3B									
E0681G (279/380)	199	1900	262	2500	500	0.050	150	1	0-180
E0681C (324/440)	199	1900	262	2500	500	0.050	150	2	180-210
E0681E (353/480)	199	1900	262	2500	500	0.050	150	3	210-240
								4	240-300
								3	300-330
								2	330-360

1) Maximum moment of inertia of rigidly added masses.
2) Max. moment of flexure due to radial forces in relation to the first main support.
3) Amplification factor of the max. permitted flexural moment (depending on the angular position of the additional radial forces)
4) Direction of the additional radial forces. (zero: TDC cylinder axis; rotation: clockwise).

Power Take-off from Engine

4.5.2 Power take off from the rear of the engine

a) Power takeoff from engine flywheel

On some models as an option, the IVECO Multipower power take-off is available. This is installed on the rear of the engine and is suitable for high power applications absorption when the vehicle is in gear and stationary (e.g. municipal vehicles, cement mixers e tc.)

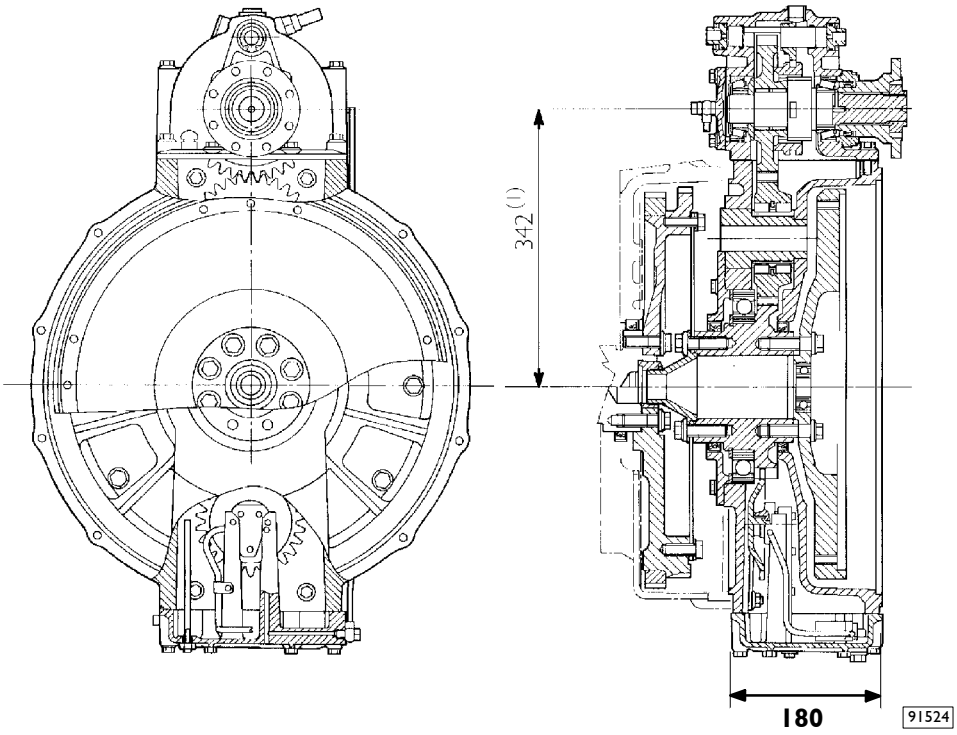
The total PTO is equipped with a non synchronized clutch with pneumatic-mechanical actuation (external to the cabin) the engagement / disengagement must only be carried out when the engine is stationary.

Safety against engagement with engine running is ensured by conditioning PTO engagement request control to PTO engaged indicator light on instrument panel.

Engine starting must only occur with no load on the PTO.

The power take-off occurs through the engine flywheel and is separate from the clutch control. The main dimensional characteristics are given in Figure 4.3 while the technical characteristics are shown in Table 4.4.

Figure 4.3



Currently available is an option for a mechanical control with flanged output via coupling shaft. The engagement and disengagement must be carried out when the engine is stationary. A safety device prevents its use when the engine is running.

Table 4.4

Output rpm/engine rpm ratio	1.29
Max. torque available	900 Nm
Output flange	ISO 7646-120 X 8 X 10
Control	pneumatic
Direction of rotation	as engine
Installation on engines	Cursor 8-13

b) Power take-off from the timing gears at rear of engine

Models equipped with engines of the Cursor 8, Cursor 10 and Cursor 13 series are supplied with friction clutch power takeoff which picks motion from the distribution gears, independently from the vehicle's clutch.

The power takeoff is available in the direct pump mount version, or with a flange for Cardan shaft.

The installation of this power takeoff must be requested when ordering the vehicle; subsequent applications require the replacement of the whole engine.

Figure 4.4 shows diagrams with dimensions and position of the PTO in relation to the engine and vehicle.

Table 4.5 gives the main data.

To take off a max. torque of 600 Nm (CURSOR 8-10) and 800 Nm (CURSOR 13) the moment of inertia of the rotating masses, movement after the power take-off (including the coupling shaft), must be no greater than: **0.03 Kgm^2.**

In no case must the max. available torque of 600 Nm (CURSOR 8-10) and 800 Nm (CURSOR 13) be exceeded.

Direct pump application

The static moment due to the added masses must not exceed 90 Nm, measured on the pump mating surface.

Connection with coupling shaft

On exceeding the maximum admissible value of the inertia, given above, it is necessary to apply a flexible coupling, specifications of the coupling to be requested directly to IVECO.

Figure 4.4

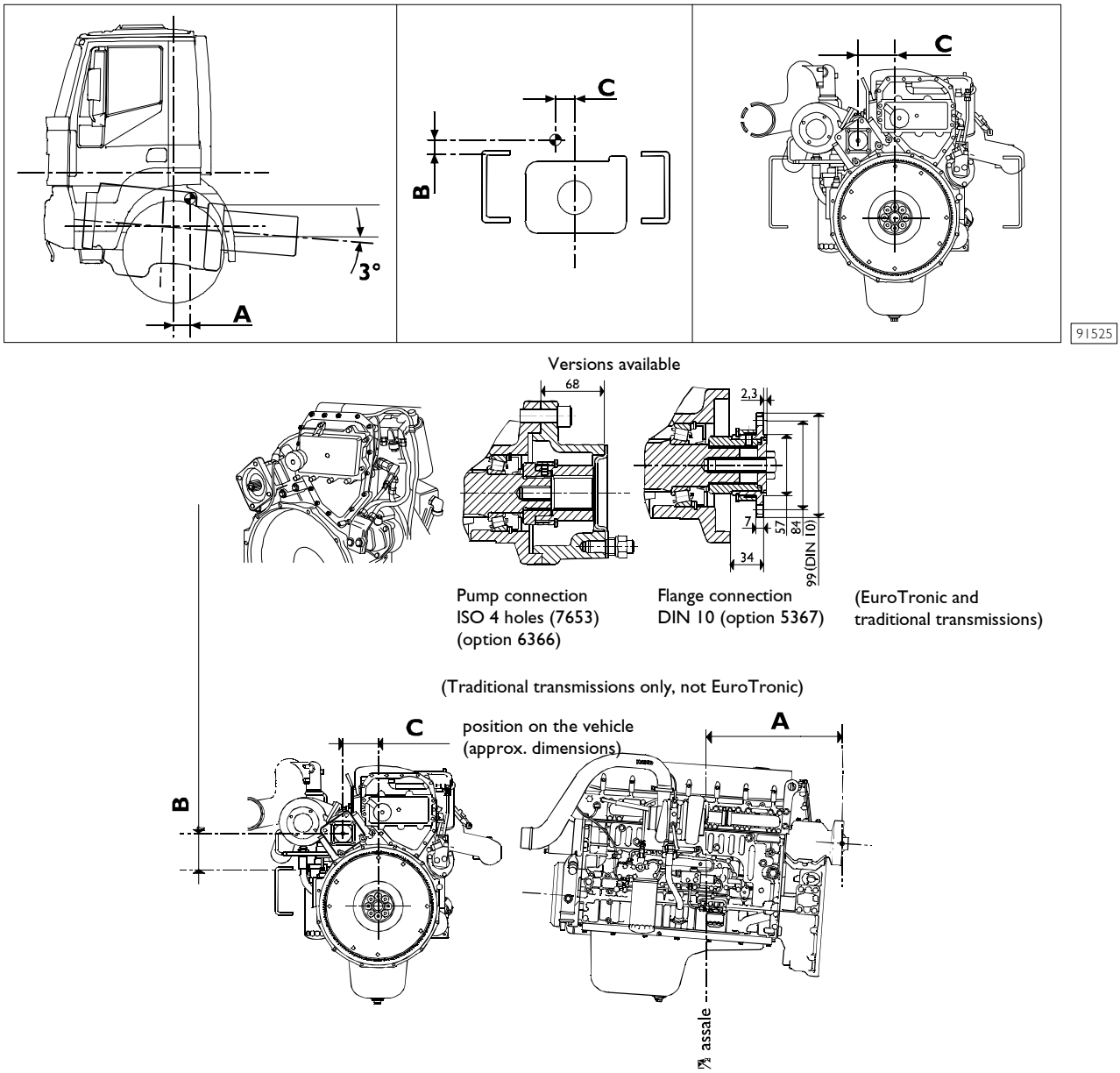


Table 4.5

Type	Configuration	A / Flange	A / Pump	B	C
Cursor 8	4x2, 6x4, 8x4	555 mm	589 mm	73 mm	154 mm
	4x4, 6x6	550 mm	584 mm	216 mm	154 mm
Cursor 13	4x2, 6x4, 8x4	658 mm	692 mm	117 mm	169 mm
	4x4, 6x6, 8x8	650 mm	686 mm	257 mm	169 mm

Multipower

This specific power take-off has the advantage that it is installed by Iveco and allows coupling pumps required for system handling and remains engaged not only during equipment load/unload operations but also with the vehicle in motion (unless it is disengaged by the operator).

While there are non problems with this particular power takeoff during normal loading and unloading operations, and during vehicle movement, some problems may occur because of the Multipower rotating speed.

As a matter of fact, the pumps connected to the Multipower, can reach a maximum rotation speed of 1800 r.p.m.; this value in fact according to the takeoff e multiplication function corresponds to a pump rotation speed of 2400 rpm.

Therefore, in order to avoid problems with the pumps, after the PTO engagement and with the vehicle being driven the rotation speed of the engine must be limited to 1800 rpm.

Consequently, in order to operate FMO equipment with this type of power takeoff, the vehicle control unit must have the three following function modes enabled:

1) Vehicle in motion

With Multipower engaged and the vehicle in motion, the vehicle control unit must receive the PTO engaged signal.

Acceleration of the vehicle is permitted, but it is not allowed to exceed the 1800 rpm threshold, set in the program of the vehicle control unit.

2) Pump engaged with accelerator de-activated

After engagement of the pump, if no part of the equipment is in operation (if no loading and unloading operations are being preformed and the compactor is not engaged), the vehicle control unit receives the pump engaged signal. The rotating speed, set by the vehicle control unit program, is kept to a minimum and accelerations from the operator are not permitted (if the accelerator pedal remains de-activated).

NOTE **This condition can be found even when, the movement of the equipment is interrupted during operation because of an alarm.**

During emergency movements, for example for the return into the profile of the members, it is advisable to carry out the manoeuvres with a reduced motor rotation speed.

Remember that with these enabled pump without accelerator request conditions during normal operation may not be frequent: in fact the compactor is always on during normal equipment operation and this implies the accelerator enabling request.

3) Pumps engaged with accelerator activated

After engauging the PTO pump and with the equipment in operation (loading, unloading and compacting operations), the vehicle control unit receives the accelerator request signal.

The rotating speed set by means of the vehicle control unit, is carried to the optimal value required to obtain the oil flow capacity required for equipment operation.

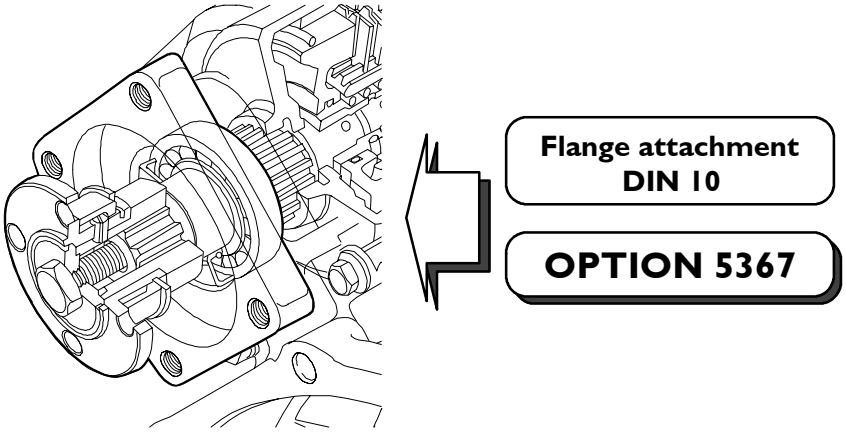
Even in this stage the operator cannot accelerate.

Therefore, three different vehicle rotating speeds and thresholds are required and must be obtained by means of three different signals that are to be sent by the equipment to the vehicle control unit.

FMO equipment without Multipower operate only on function 2 and 3.

Power take-off from timing gears for Eurotronic 2 transmissions

Figure 4.5



EuroTronic transmissions are compatible with engine distribution PTOs providing a flange attachment is used.

Two PTOs specific for EuroTronic transmissions only are provided OPT 7345 - OPT 6369
All PTOs for mechanical transmission can be fitted on EuroTronic transmissions.

Table 4.6 - PTO Specifications

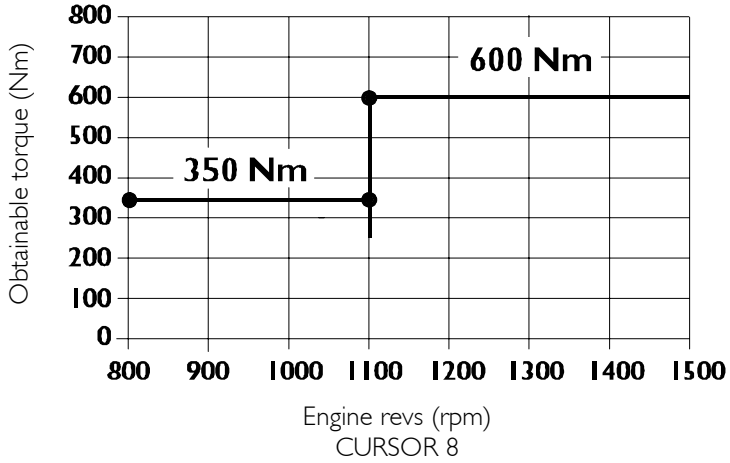
Engine	Power take-off				
	Max. torque available for drawing Nm	Out rpm/engine rpm ratio	Output type		Direction of rotation
			Pump conn.	Flange conn.	
F2B CURSOR 8	600	1,14	ISO 4 holes (7653)	DIN 10	Opposite to engine
F3B CURSOR 13	800	1,12	ISO 4 holes (7653)	DIN 10	Opposite to engine

NOTE PTO can be equipped with a pneumatic disc clutch in oil bath system.

Limits of the torque obtainable from the power takeoff according to engine revs

Torque drawing from the power takeoff is described in the following diagrams:

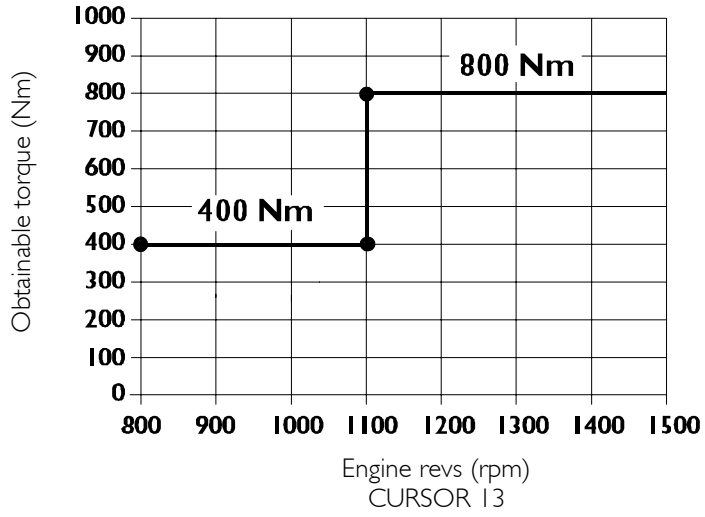
Figure 4.6



Vehicle programming

- **Vehicle stopped - PTO mode ON**
  Take-off of up to 600 Nm of torque is permitted at engine speeds of over 1100 rpm.
- **Vehicle running - PTO mode ON**
  - no limit to the torque obtainable from the power takeoff according to engine revs;
  - engine idle running set to 800 r.p.m.;
  - the air supply system pressure fot PTO clutch coupling must be above 8 bars.

Figure 4.7



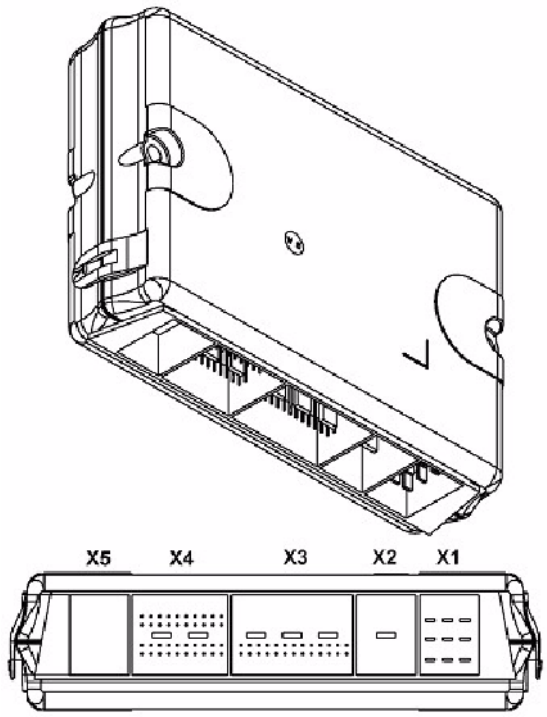
Vehicle programming

- **Vehicle stopped - PTO mode ON**
  Torque drawing of 800 Nm is permitted over 1100 r.p.m.
- **Vehicle running - PTO mode ON**
  - no limit to the torque obtainable from the power takeoff according to engine revs;
  - engine idle running set to 700 r.p.m.;
  - the air supply system pressure for PTO clutch coupling must be above 8 bars.

4.6 PTO management

Operations which do not comply with the instructions specified by IVECO or made by non qualified personnel can cause severe damage to on-board systems, effect driving safety and good operation of the vehicle and cause considerable damage which is not covered by warranty.

Figure 4.8



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EM ECU (IT IS LOCATED IN THE ECU HOUSING IN FRONT OF PASSENGER SEAT)

4.6.1 General Specifications

Two operations are required to operate a PTO:

1) mechanical PTO engagement;

2) PTO mode to be associated to the PTO. See below for PTO mode definitions.

The expression "PTO active" indicates that the PTO is engaged and that one of the PTO modes is active; otherwise, it is said that the PTO is engaged only.

Actions 1) and 2) can be carried out with two separate commands, in 1)-2) sequence.

3) A control carrying out actions 1 and 2 simultaneously

In general, PTO can be engaged by an electric command (triggered by a s olenoid valve) or by a pneumatic command.

4) PTO cutout conditions

It is important to use the signals available on the bodybuilders connectors (e.g. parking brake applied, stationary vehicle signal, reverse gear not engaged) to ensure correct PTO management and avoid possible damage to the vehicle's mechanisms.

These signals must exclusively be taken from the bodybuilders connections, ST14.

Based on required use, the body maker must address to IVECO service for ECU programming (Body Computer, ECU on gearbox if EuroTronic) that, together with EDC, manage PTO operation.

With the assistance of tables contained in para below, the body maker can identify the configuration of the PTO control electronic system, herein conventionally called PTO1, 2 and 3. The body maker can choose, at the IVECO assistance network, one of the available configurations preset on EASY.

4.6.2 PTO 0 mode (run mode)

In normal operation, an intermediate rpm ratio can be activated to a speed of 30 km/h (important note: the speed regulator will trip at speeds exceeding 30 km/h). Press Resume on the steering wheel stalk unit to activate. A new intermediate r.p.m. can be memorised by the driver by pressing the Resume pushbutton for 3 to 10 seconds, in this case no IVECO Service reprogramming is required.

The maximum rpm achievable with SET+ is identical for all modes.

The minimum rpm achievable with SET- is identical for all modes. The idle speed adjustment range is exactly the same for all modes.

Settings shown in the following table cannot be changed for PTO 0 mode (drive mode).

PTO management

Table 4.7

Button	Function
Resume/OFF	To switch the intermediate rpm ratio on/off. The intermediate rpm ratio is programmed by default at 900 rpm and can be changed by the driver.
SET+/SET-	Increase/reduction of intermediate activated rpm250 rpm for each second of pressure applied on push-button
Accelerator pedal	Active
Maximum rpm which can be reached with SET+ button or accelerator pedal	N_{LL} [1] ÷ 1800 rpm
Output torque	Maximum specific vehicle torque
Conditions for deactivating intermediate rpm ratio	- Operate brake or clutch pedal - Activate CC OFF - Operate engine brake (from driver - No Neutral for automatic) - PTO 0 disabling speed

[1] N_{LL} N° revs when idling.

4.6.3 Configurable PTO 1, 2, 3 modes

IVECO Service can program three different, independent PTO mappings (engine operation settings) in the engine ECU (PTO). Obviously, the engine can only run according to one PTO mode at a time. The following priority order is used to solve this problem:

- PTO mode 3: high priority
- PTO mode 2: medium priority
- PTO mode 1: low priority
- PTO mode 0: driving mode

These priorities must be taken into account during reprogramming. Problems may arise if the sequence is not respected and the PTO wiring may need to be modified. Alternatively, the VCM ECU may need to be reconfigured, etc.

The table below shows the parameters that, as a whole, constitute PTO mode. The parameters can only be programmed using the EASY test tool available a IVECO Service.

NOTE Updating with E.A.SY. software must be performed before using the MODUS station.

Table 4.8

Parameter	Possible values
Gradient SET+/SET-	250 rpm for each second of pressure applied on push-button
Maximum N5 of revs that can be reached with SET+, NSET_max	N_{LL} ÷ 1800
Torque limitation (3)	See Table
Runaway speed regulator gradient	0 ÷ 0,2 rpm/Nm
Use of the CC buttons (Resume/SET+/SET-)	Enabled / disabled
Storing of intermediate speed rate	Fixed (E.A.SY.)/free (driver)
TIP function, for SET+/SET- (4)	20 rev/TIP (10 ÷ 200 revs/TIP)
PTO mode disabling by means of : the brake the clutch the parking brake neutral the engine brake (by the driver) the retarder speed disabling	 Enabled Enabled Disabled Disabled Enabled Disabled Enabled
Call-up intermediate speed rate stored with Resume on enabling PTO (7)	Enabled / disabled
Minimum N° of revs that can be reached with SET-, NSET_min	> 600 rpm
Maximum speed of the vehicle, above which PTO mode is enabled (intermediate speed rate V_{ZDR_max})	between 1 km/h and 90 km/h
Possible power take-off rate range (1)	N_{LL} ÷ 2700 rpm (2) per Cursor 8 N_{LL} ÷ 2340 rpm (2) per Cursor 13

Abbreviations:

NLL	Idling rpm
N_{max}	Maximum rpm
N_{res}	Stored rpm press Resume or activate PTO mode to recall
N_{SET_max}	Maximum rpm achievable with SET+ button identical for all PTO modes
N_{SET_min}	Minimum rpm achievable with SET

(1) The reference speed is that of the crankshaft, not the PTO. The corresponding PTO rpm must be calculated by means of the PTO reduction ratio.

(2) The following rules refer to intermediate rpm ratio adjustment:
- Never drop under the N_{LL} value.
- Never exceed the N_{max} value.
- In general $N_{LL} = N_{SET\_min} = N_{res}$ and $N_{res} = N_{SET\_max} = N_{max}$. If the latter is not true, the engine rpm is limited to N_{max}.

(3) See para. 4.6.3.1.

(4) The TIP function (i.e. brief pressure on SET+/SET- toggle button for <1 s) is used to gradually vary the intermediate rpm regulator and the speed regulator. The intermediate rpm regulator will be activated at speed <30 km/h; the speed regulator will be activated at speed > 30 km/h. The speed variation of the intermediate rpm regulator steps are equal to 20 rpm for tip, which corresponds to 1 km/h for the speed regulator.

(5) Active — the power take off mode is disengaged when the service brake or the clutch pedals are pressed.
Disabled — the power take off mode is not disengaged when the service brake or the clutch pedals are pressed.
In PTO mode 0, the power take off mode is disengaged when the service brake or the clutch pedals are pressed.

(6) Active — the power take off mode is disengaged when the parking brake or the clutch pedals are pressed.
Disabled — the power take off mode is not disengaged when the parking brake or the clutch pedals are pressed.
In PTO mode 0, the power take off mode is not disengaged when the parking brake is engaged.

(7) Active — the engine goes automatically to the chosen Nres value for that power take off mode.
Disabled — the engine remains at the previous rate, to reach the value Nres it is necessary to press the Resume button (pin 9 and 12 on the 21 pin connector).

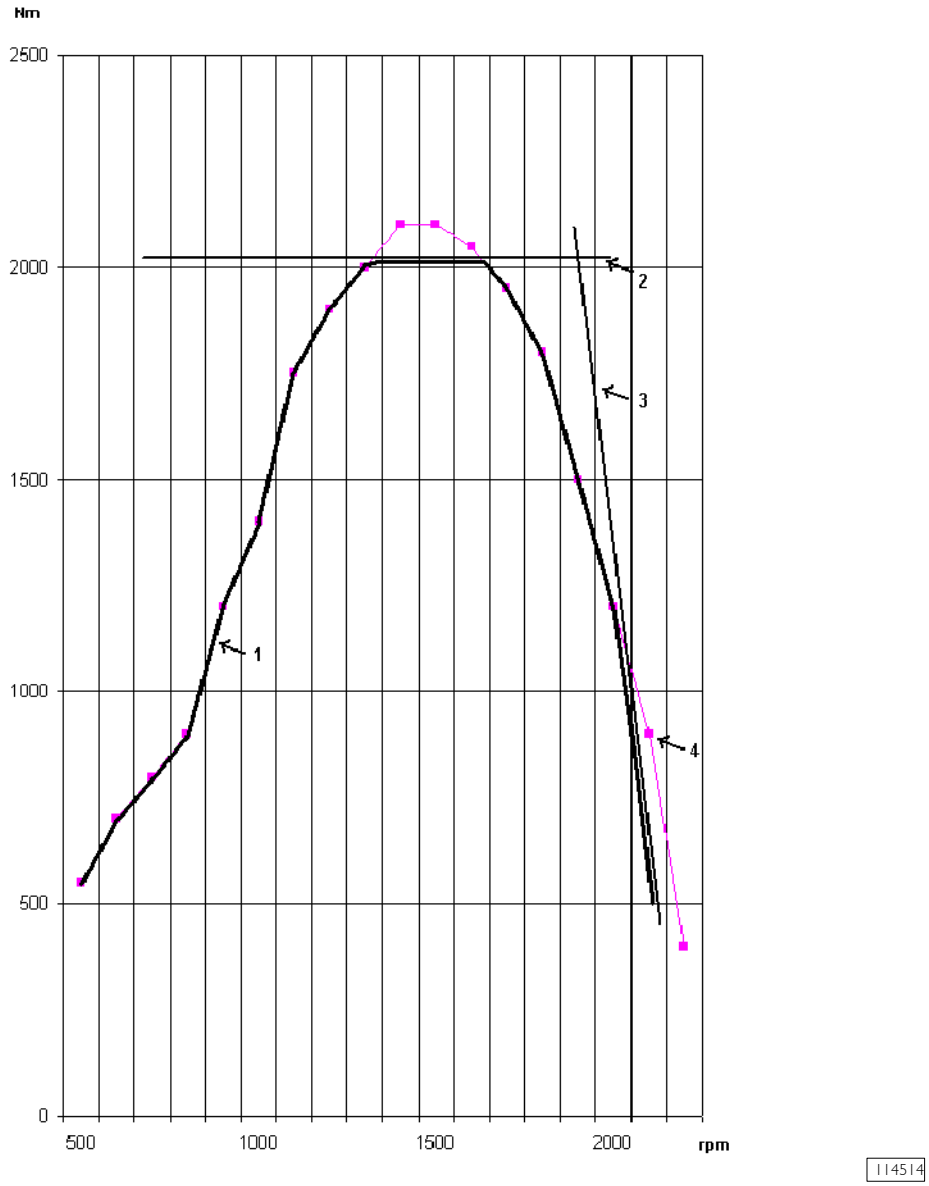
PTO management

4.6.3.1 Changing the torque curve, maximum rpm and the overrun regulator curve gradient

The following can be limited to mechanically protect the PTO:

- Maximum engine torque to protect against overloading (horizontal section of the curve in Figure 4.9).
  A straight limitation line (providing a maximum torque value) and a rev number / torque curve already defined by means of 16 points can be defined for each motor power.
  The unit uses the minimum value between the straight line and the curve (See Figure 4.9).

Figure 4.9



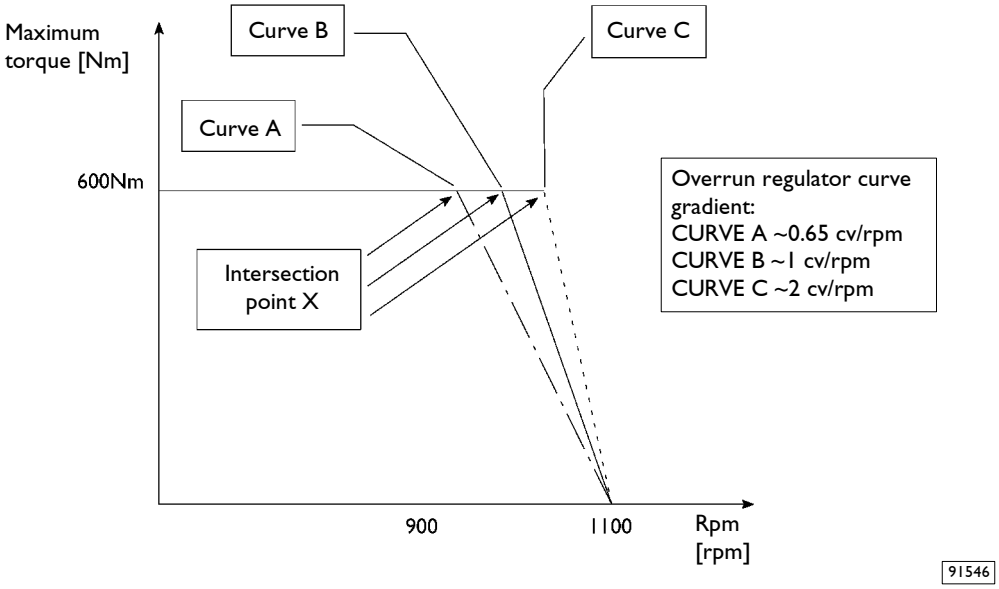
1. Resultant curve - 2. Maximum torque straight limitation line - 3. Out of rev curve - 4. Curve points

- Maximum engine rpm to protect against overrun (slanted section of curve in Figure 4.9). This limitation is called "runaway regulator".

These limitations (maximum torque, intersection point, curve gradient) can be selected independently of each other. The combination of limitations is recommended. In this case, according to the envisaged PTO use, bodybuilders shall select the engine ratio limit (intersection point X) which must be made available to the selected torque.

The overrun regulator trips when the engine ratio exceeds the intersection point X. Note that the reference speed is that of the crankshaft, not the PTO. The corresponding PTO rpm must be calculated by means of the PTO reduction ratio.

Figure 4.10



See example in Figure 4.10:

- Maximum engine torque 600 Nm.
- The standard operation of the PTO is 900 rpm.
- The engine rpm must not exceed 1100 rpm.
- The rpm must be determined for all of the overrun regulator slope.

The slope of the curve for the overrun regulator depends on the particular use of the vehicle. For this reason, when stationary, it is generally sufficient for the overrun regulator to have a steep curve, whereas for the "driving" mode, this might give rise to rapid changes in load, which may cause problems.

Power is 1100 rpm and torque is equal to 600 Nm i.e.:

$$P = (600\ Nm \times 1100\ rpm)/9550 = 69\ KW$$

The available rpm at 600 Nm can be calculated using a steeper overrun regulator (curve C; gradient 2CV/rpm):

$$1100\ rpm - (94CV/2CV/rpm) = 1100\ rpm - 47\ rpm = 1053\ rpm$$

The available rpm at 600 Nm can be calculated by using an intermediate overrun regulator (curve B; gradient 1CV/rpm):

$$1100rpm - (94CV/1CV/rpm) = 1100\ rpm - 94\ rpm = 1006\ rpm$$

The available rpm at 600 Nm can be calculated by using a flat overrun regulator (curve A; gradient 0.65CV/rpm):

$$1100rpm - (94CV/0.65CV/rpm) = 1100\ rpm - 145\ rpm = 955\ rpm$$

Engaging rpm regulator variable from 0 and 0.2 rpm*Nm

In the considered example, intermediate stored rpm N_{res} should be adjusted to 900 rpm. This intermediate rpm should be automatically activated when PTO mode is engaged.

The example shows the impact of the overrun regulator. Depending on the usage the chosen torque of 600 Nm is available up to 1055 rpm, 1005 rpm or 955 rpm.

The same is true in reverse, when engine torque, intersection point X and overrun regulator curve inclination are predefined, it is possible to calculate the final rpm speed.

The maximum rpm N_{max} is a theoretical value. This is the rpm at which the ECU reduces the injected amount of fuel at 0 mg/stroke. Considering that all engines, according to the rpm (engine hot and no load) need 20+30 mg/stroke of fuel to maintain the rpm, this theoretical value N_{max} is never reached. According to the slope of the overrun regulator, the rpm actually reached is 10+40 rpm lower. You are advised to define overrun ratio by means of practical tests if this is likely to effect the application.

4.6.4 Intermediate rpm regulator

Maximum intermediate rpm regulator setting that can be achieved with SET+, N_{SET_max}

TThe TIP function, i.e. a very short press (< 1s) on the SET+/SET- keys, allows a gradual change in the intermediate speed regulator or speed regulator. With speed <V0 (max speed of PTO mode) km/h, the intermediate rpm governor can be activated.

With speed >V0 km/h, the speed governor is activated. The change for the intermediate speed regulator is equal to 20 rpm rpm for each TIP i.e. 1 km/h for each TIP with the speed regulator.

The intermediate rpm or speed value is modified continuously by pressing the SET+ and SET- buttons for more than (>1 s). The effective rpm and effective speed when the SET+ and SET- buttons are released and stored as the new value.

Function TIP with SET + and SET - can be disengaged. This configuration is applicable to all PTO modes simultaneously (drive mode 0, PTO mode 1, 2 and 3). Function TIP disengagement activates the speed limiter operation limitation. Therefore, this change should only be operated after an in-depth analysis.

NOTE This function is provided for the regulation of hydraulic units.

Increasing/decreasing rpm with SET+/SET-

The intermediate rpm regulator value can be changed by pressing the SET+/SET- buttons for more than (>1 s) or when the TIP function is deactivated by a certain speed (engine rpm increase/decrease per second). The time interval for this change can be calculated using the following formula:

Time required [s] = Rpm difference [rpm/s] / rpm increase per second [rpm/s /s]

Example: take the intermediate rpm from 800 rpm to 1800 rpm using the SET+ button. The difference in rpm is equal to 1000 rpm, consequently:

- At a speed of 250 rpm/s, the time interval is 1000/250 = 4s

Activating/deactivating the accelerator pedal

The accelerator pedal is always active in normal driving mode (PTO mode 0). The accelerator pedal can be deactivated in PTO modes 1, 2 or 3. In this case, PTO engine regulation will ignore the accelerator pedal. If the accelerator pedal is active, the engine rpm can be increased by means of the pedal to the maximum rpm N_{max} valid at the time.

4.6.5 Standard configurations

The default settings are shown in the table.

Table 4.9

	PTO mode			
	Mode 0	**Mode 1**	**Mode 2**	**Mode 3**
Enabled using 21 pin connector (ST14)	No enablingis required	Pin 18 and 17 connected	Pin 18 and 17 connected	Pin 20 and 17 connected
Max torque	Maximum engine torque	engine (*)	engine (*)	engine (*)
Maximum N° of revs that can be reached with SET+, N_{SET_max}				
Cursor 8	2700 rpm	1800 rpm	2700 rpm	2700 rpm
Cursor 13	2340 rpm	1800 rpm	2340 rpm	2340 rpm
Minimum N° of revs that can be reached with SET-, N_{SET_min}	Minimum value based on the N_{LL} motor default			
Inclination of the curve of the out of rev regualtor ranging	0.06 rev/Nm	0.2 rev/Nm		
Accelerator pedal	Active	Active	Active	Active
Use of the CC buttons (Resume/SET+/SET-)	Active	Active	Active	Active
N° revs stored, N_{res}	900 rpm	900 rpm	1100 rpm	1300 rpm
Maximum speed of the vehicle, above which PTO mode is disabled, V_{ZDR_max}	25 [2 (1)] km/h	35 km/h	35 km/h	35 km/h
Call-up intermediate speed regime stored on enabling PTO mode	Disabled	Active	Active	Active
PTO mode disabling by means of :				
the brake	Active	Active	Active	Active
the clutch (1)	Active	Disabled	Disabled	Disabled
the parking brake	Disabled	Disabled	Disabled	Disabled
neutral	Disabled	Disabled	Disabled	Disabled
the engine brake (by the driver)	Active	Active	Active	Active
the retarder	Disabled	Disabled	Disabled	Disabled
speed disabling	Active	Active	Active	Active

Increase or diminishment of motor revs with SET+/SET- pushbuttons is 250 r.p.m..
(*) 3000 Nm for mechanical transmission; valid for all 16 torque curve points (see Figure 4.9)
1) disabled with automatic transmissions

4.6.6 Specific indications: correlation between the VCM configuration and the installed power take offs

There is no direct connection between the PTO power take off mode (which can be activated using the 21-pin connector) and the power take offs physically fitted to the vehicle. Therefore, the bodybuilder can define the necessary connections as suits him.

This set up therefore makes it possible to use the power take off(s) with the various PTO configurations (for example, for particular work cycles). Should a work cycle be established, for example, in which the fitted power take off is made to operate in different conditions, then up to a maximum of 3 modes for the PTO power take off can be used. The corresponding PTO power take off modes must be activated from the body/ancillary at the relevant times.

In a similar way, it is possible to correlate an PTO power take off mode even without there being a power take off physically fitted to the vehicle, or conversely when there is more than one fitted.

4.6.7 Engaging the power take off

The power take-offs fitted on the gearbox can only be engaged with the clutch fully pressed.

The PTO mode power take-offs, on the other hand, can be enabled independent of the above.

4.6.8 With Allison Gearbox

When the vehicle has an Allison gearbox, the selection of the power take off is co-ordinated by the gearbox central control unit. The operation uses the following procedure:

- request to engage the power take off (the gearbox central control unit checks the internal conditions so that the operation can be effected safely: engine speed less than 900 rpm and output speed from the gearbox less than 250 rpm);
- the solenoid valve used to engage the power take off is activated by the central control unit;
- a check is made that the power take off is functioning safely (output speed from the gearbox less than 300 rpm).
  The button for engaging the power take off is located in the central section of the dashboard.

Before engaging the power take off, the gearbox central control unit checks a number of parameters (engine speed is less than 900 rpm and output speed from the gearbox is less than 250 rpm).

If all the necessary conditions inside the gearbox are satisfied, the Allison gearbox central control unit automatically engages the power take off. The restrictions (end speed, maximum torque etc) for the PTO power take off mode selected therefore remain valid even while the engagement takes place.

Certain values may be modified by Allison Customer Assistance, as required by the bodybuilder.

4.6.9 Use of the power take-off with vehicle in motion

If restrictions are not required (e.g. restrictions on torque, reduced maximum number of engine revs, etc) when the power take off is engaged, it is not necessary to use any PTO power take off mode.

In this case, however, the engine power available for running the vehicle is reduced (given that power is being taken simultaneously by the ancillary). This could lead to acceleration problems. In typical usages (e.g. cement mixers, refuse collection vehicles etc) this problem can be minimised by increasing the idling speed. This increased number of revs would, however, also then be present even when the power take off was disengaged. In general, a reduction in the maximum torque in this field of operation would not be considered sensible.

If, however, restrictions are required (e.g. restrictions on torque, reduced maximum number of engine revs, etc) then an PTO power take off mode should be used.

PTO management

Particularly when the vehicle is operational, care must be taken to ensure that if an PTO power take off mode is activated, then the stored intermediate number of revs must also be activated at the same time. This could, however, result in an unexpected increase in vehicle speed. It is the bodybuilder's responsibility to ensure that the chosen solution is safe.

The engagement or disengagement of the power take off depends both on the power take off chosen and the requirements of the bodybuilder.

Regarding vehicle operation (up to a maximum speed of 30 km/h) with an increased number of revs when the power take off is engaged. For a range of applications, (e.g. use of a tipping body, cement mixer, refuse collection etc) higher revs are also required during operation. This can be achieved using the following set up:

- Stored intermediate number of revs Nres: fixed programming
- Intermediate number of revs (Nres): as defined by the bodybuilder
- Disengagement of the intermediate number of revs: deactivated via the clutch or brake pedals
- Accelerator pedal: activated
- CC Buttons: deactivated

In this way, the engine can only operate again when the accelerator pedal is regulated between the stored intermediate number of revs, Nres, and the maximum number of revs, Nmax. If VZDR-aus is ever reached, the intermediate number of revs and therefore also the increase in revs is deactivated.

Changing the stored intermediate number of revs N_{res}

The intermediate number of revs can be modified separately for each PTO power take off mode.
It is necessary to distinguish between two possibilities:

1) Fixed programming (E.A.SY.)
For mode 0 power takeoff (driving mode), this mode is not available. A modification is only possible by reprogramming the E.A.SY. test tool at IVECO Service

2) Free programming (by the driver)
To modify the intermediate number of revs, the following procedure is used:
a) select the particular PTO power take off mode whose intermediate number of revs are to be
b) set the desired intermediate number of revs using the SET+/SET- button;
c) press and hold CC Resume for 3 to 10 seconds.

NOTE Updating with E.A.SY. software must be performed before using the MODUS station.

The minimum number of revs reachable can be regulated by means of the SET-, NSET_min pushbutton for PTO 0

The idling speed must only be set when the engine is warm. There are three stages in the process:

1) Idle running actuation
The engine must operate at idling speed.

- Actuate the service brake (until the end of adjustment)
- Press and hold the Resume pushbutton for 3 to 7 seconds.
Immediately afterwards, the idling speed reduces automatically to the minimum value. Actuate the service brake (until the end of adjustment).

PTO management

2) Modifying the minimum idling speed
It is possible to regulate the idling speed by intervals of 20 min-1 using the SET+ or SET- buttons.

3) Recording the minimum idling speed (in revs)
The speed is stored by pressing the CC Resume button again (for a period of time ranging between 3 and 7 seconds.)

Influence of the exhaust brake on the intermediate number of revs

The engine brake can be activated by:

1) Pressing the engine brake pedal (on the cab's floor)

2) Pressing the brake pedal (when the brake is pressed the engine brake is automatically activated).

3) Pressing the accelerator pedal (at idling speed the engine brake is automatically activated).
Selections can be made by means of a switch placed on the dashboard.

If the engine brake is activated in any manner as described above (2 or 3) the governor deactivates automatically.

When the engine brake pedal is pressed, the CC push button functions (CC OFF/Resume/SET+/SET-) are disabled.

Simultaneous operation of SET+ and SET-

These functions are mutually exclusive. Should both be activated simultaneously, then for safety reasons the CC Off button is activated immediately or after 500 ms. If, however, the buttons were pressed simultaneously, the engine's EDC central control unit recognises an error after 500 ms.

Second speed limiter

This function can be activated independently of the various PTO power take off modes (driving mode 0, power take off modes 1, 2 and 3). IVECO Service can set the value using a E.A.SY. station. The seond speed limiter is enabled by contact towards K15 on pin 1 of the 9 pin connector (ST14B).

NOTE The use of the MODUS station must take place after an upgrade is run using E.A.SY. software

4.7 EM (Expansion Module)

The optional 4572, EM (Expansion Module), is available on all the new Trakker.

The EM control unit can be used for electrical management of the PTO and for special applications. Also provides special gateways such as: trailer interface ISO11992-3 (TT) and CAN OPEN interface (BB in development phase).

Diagnostics is possible via CAN line and K line.

The wiring diagram for the Expansion Module hardware is shown in Figure 4.11, and the block diagram of the hardware structure is shown in Figure 4.12.

Figure 4.11

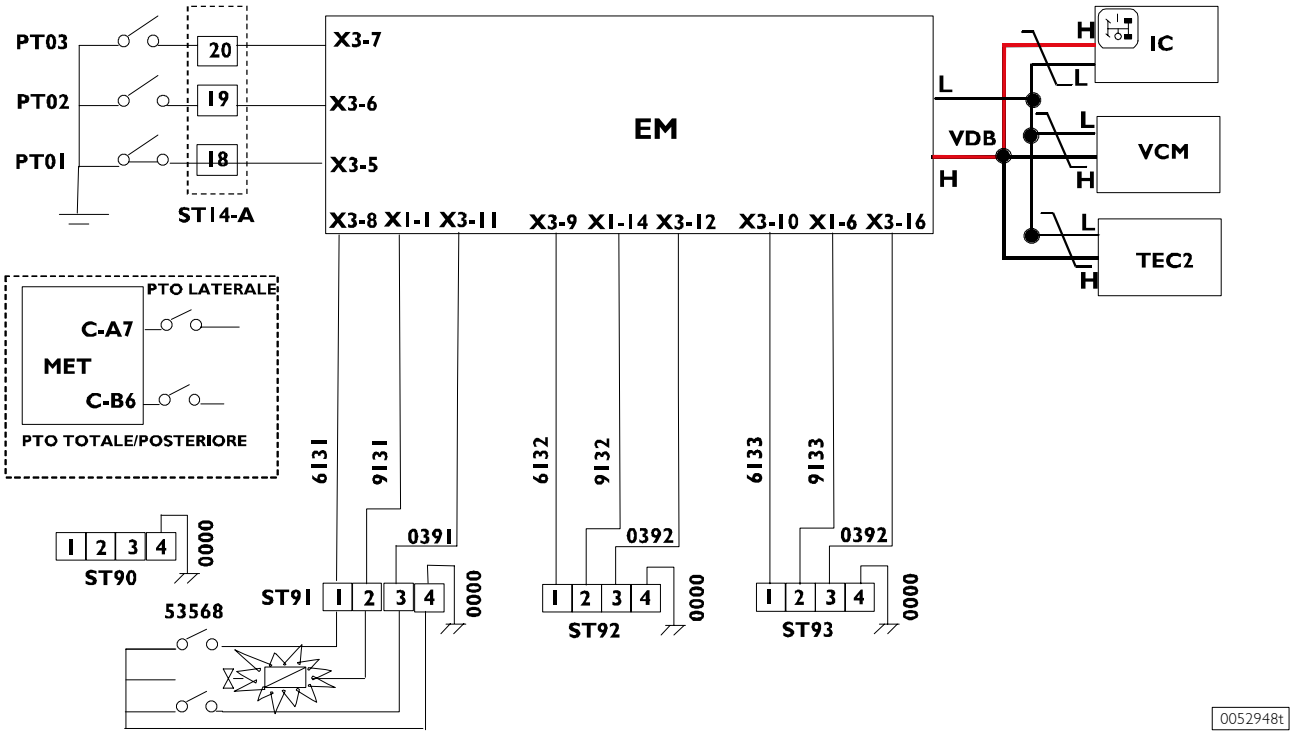
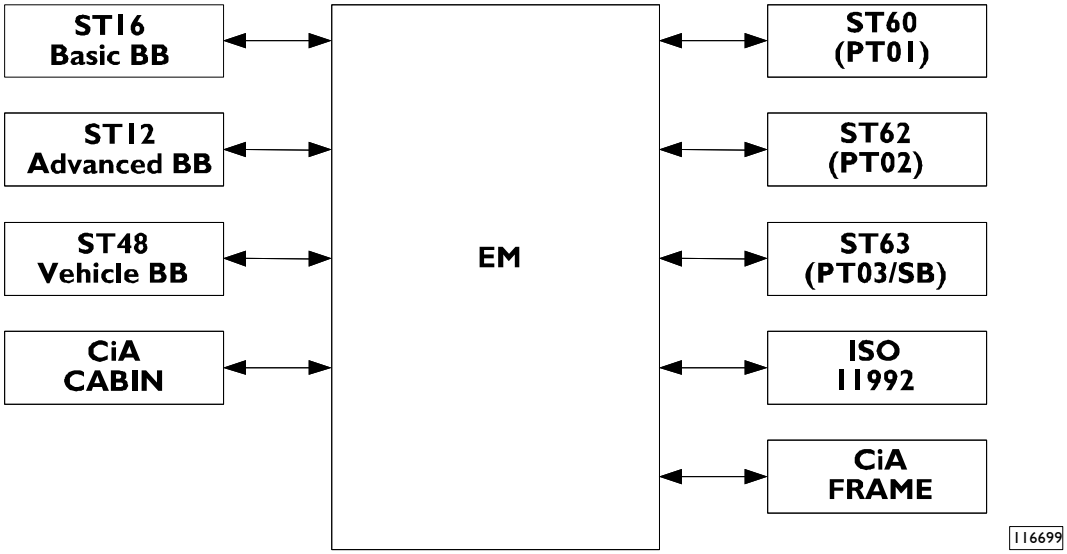


Figure 4.12



The EM control unit allows the PTO activation and deactivation conditions to be set.

The connections on ST60, ST62 and ST63 must be carried out by the fitter so as to activate and display on IC the activation of the PTO.

The predefined set conditions for Trakker Euro 4-5 are:

4.7.1 Connections

Table 4.10 - PTO mode request: ST13

PTO 1	pin 18
PTO 2	pin 19
PTO 3	pin 20

To carry out the request, close the pins on the earth of pin 17.

Table 4.11 - PTO IN/OUT: ST60 PTO1, ST62 PTO2, ST63 PTO3

pin 1	PTO feed-back
pin 2	PTO actuator (solenoid valve control)
pin 3	PTO enabling
pin 4	Ground

4.7.2 PTO activation/deactivation conditions:

NOTE These conditions can be modified in Customer Service.

Table 4.12

State of brake pedal	pressed/not pressed
State of parking brake	engaged/not engaged
tate of clutch pedal	pressed/not pressed
State of pressure switch	open/closed
State of the gear	neutral/not in neutral/reverse
Allowed set of gears	
Allowed engine revolutions	
Allowed vehicle speeds	
Maximum temperature of coolant	
Maximum percentage of clutch slipping	

4.7.3 No PTO installed or provisions for PTO:

Default configuration

PTO options: 5439, 5194, 6368, 1483, 1484.

Only the programming of the engine revolutions by the VCM is required.
The switches select the three rpm modes:

PTO 1	PTO mode 1	900 [tr/min]
PTO 2	PTO mode 2	1100 [tr/min]
PTO 3	PTO mode 3	1300 [tr/min]

4.7.4 PTO Multipower

Default configuration

PTO option: 2395 for all gearboxes.

NOTE These conditions can be modified in Customer Service.

EM (Expansion Module)

Table 4.13 - Activation conditions

State of engine	OFF
Pressure switch	closed
State of vehicle	stationary
Coolant temperature	< 120 [°C]

Table 4.14 - Deactivation conditions

Coolant temperature	> 120 [°C]

4.7.5 PTO manual gearbox with electric engagement

Default configuration

PTO options: 6392, 6393, 1459, 1505, 1507, 1509, 6384, 14553, 14554 for all manual gearboxes.

NOTE These conditions can be modified in Customer Service.

Table 4.15 - Activation conditions

State of engine	ON
Coolant temperature	< 120 [°C]

Table 4.16 - Deactivation conditions

State of vehicle	OFF
Vehicle speed	> 25 [km/h]
Coolant temperature	> 120 [°C]

4.7.6 PTO FOCSA

Default configuration

NOTE These conditions can be modified in Customer Service.

Table 4.17 - Activation conditions

State of engine	ON (always enabled)

Table 4.18 - Deactivation conditions

State of engine	OFF

4.7.7 Engine PTO

Default configuration

NOTE These conditions can be modified in Customer Service.

Table 4.19 - Activation conditions

State of engine	ON
State of vehicle	stationary
Coolant temperature	< 120 [°C]

Table 4.20 - Deactivation conditions

State of vehicle	OFF
Coolant temperature	> 120 [°C]

4.7.8 PTO Eurotronic 2 transmission

Default configuration

NOTE These conditions can be modified in Customer Service.

Table 4.21 - Activation conditions

State of gearbox	enabled
State of engine	ON
State of vehicle	stationary
Coolant temperature	< 120 [°C]

Table 4.22 - Deactivation conditions

State of vehicle	OFF
Coolant temperature	> 120 [°C]

4.7.9 PTO TRANSFER BOX

Default configuration

NOTE These conditions can be modified in Customer Service.

Table 4.23 - Activation conditions

Clutch state	released
State of engine	ON
State of vehicle	stationary
Coolant temperature	< 120 [°C]

Table 4.24 - Deactivation conditions

State of vehicle	OFF
Coolant temperature	> 120 [°C]

EM (Expansion Module)

SECTION 5

Special instructions for electronic subsystems

NOTE This chapter contains important information concerning the electronic network (MUX) installed on Trakker.

5.1 Multiplex system (MUX)

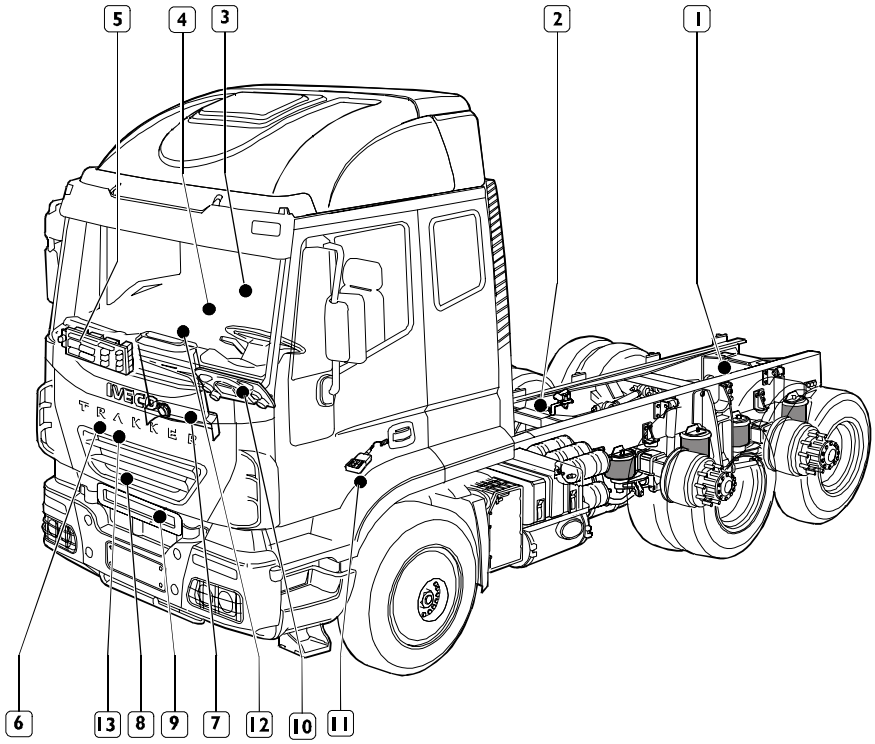
Trakker is equipped with an innovative electronic system, Multiplex (EASY MUX). The system electronically manages and controls the vehicle subsystems on CAN lines. The most important characteristics of MUX devices are shown in the paragraphs that follow.

5.1.1 Description of MUX ECUs

The location (Figure 5.1) and functions of the MUX ECUs (electronic control units) installed in the vehicle are illustrated below for a better understanding of the IVECO Multiplex system.

Devices or electrical circuits cannot be directly connected to the ECUs described below. Always only use the connectors and special interfaces listed in the following paragraphs (bodybuilder connectors 5.2).

Figure 5.1

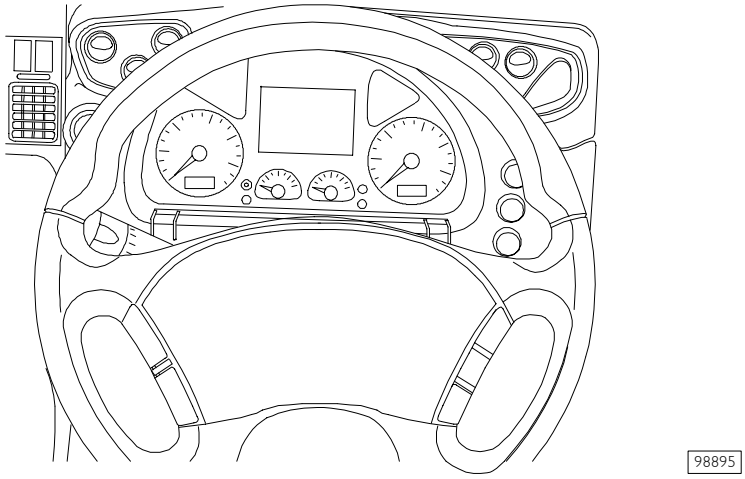


1. RFC on trucks - 2. RFC on tractors - 3. BM Bed Module - 4. AHT.A (additional heater) - 5. IBC3 - 6. Terminal board - 7. CC Climate Control - 8. AHT.W (additional coolant heater) - 9. FFC Front Frame Computer - 10. IC Instrument Cluster - 11. DDM Drive Door Module - 12. PDM Passenger Door Module - 13. EM (Expansion Module)

5.1.1.1 Instrument Cluster (IC)

The instrument cluster (IC) is the main interface between the driver and the vehicle electronic subsystems. All information on system status and error messages concerning single subsystems are shown on the instrument cluster (see specific documentation for diagnostics).

Figure 5.2

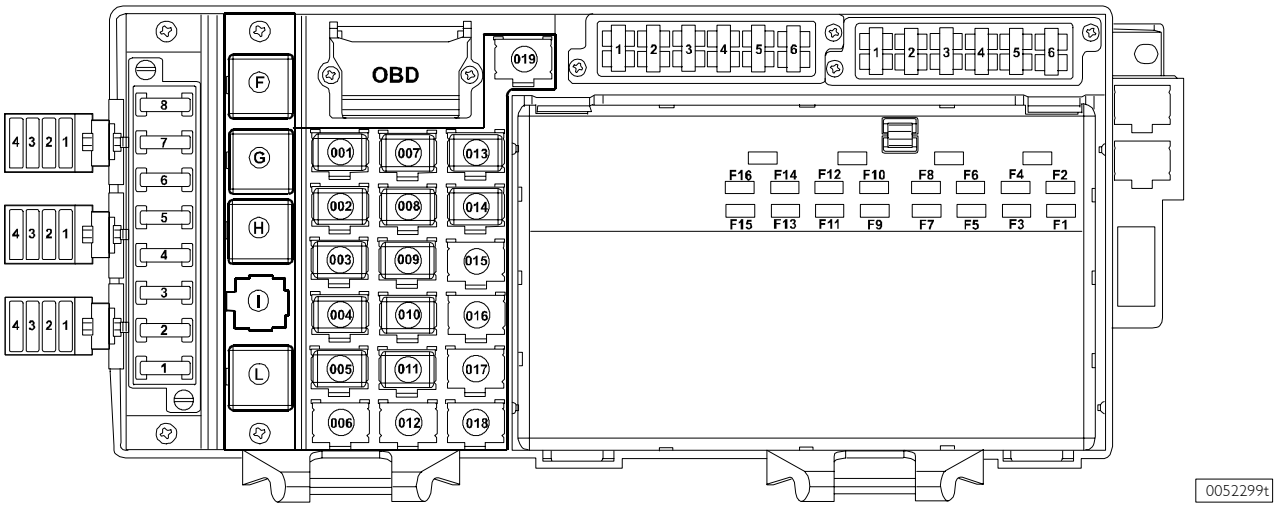


INSTRUMENT CLUSTER (IC)

5.1.1.2 Iveco Body Controller (IBC3)

Figure 5.3 shows the Body Computer which processes all the input and output signals for controlling vehicle subsystems. This function is assisted by an ancillary ECU, called Cab Module.

Figure 5.3

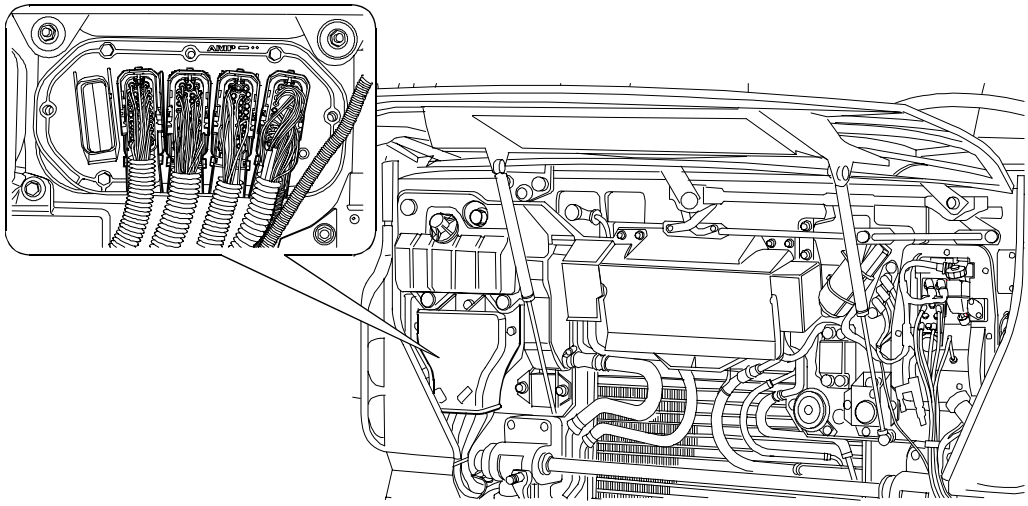


IBC3 CONTROL UNIT

5.1.1.3 Terminal board (electrical circuit passage)

The subsystems fitted on the body are connected to the ECUs in the cab via the terminal board which is the interface for connectors on body and cab side. It is located under the hood.

Figure 5.4



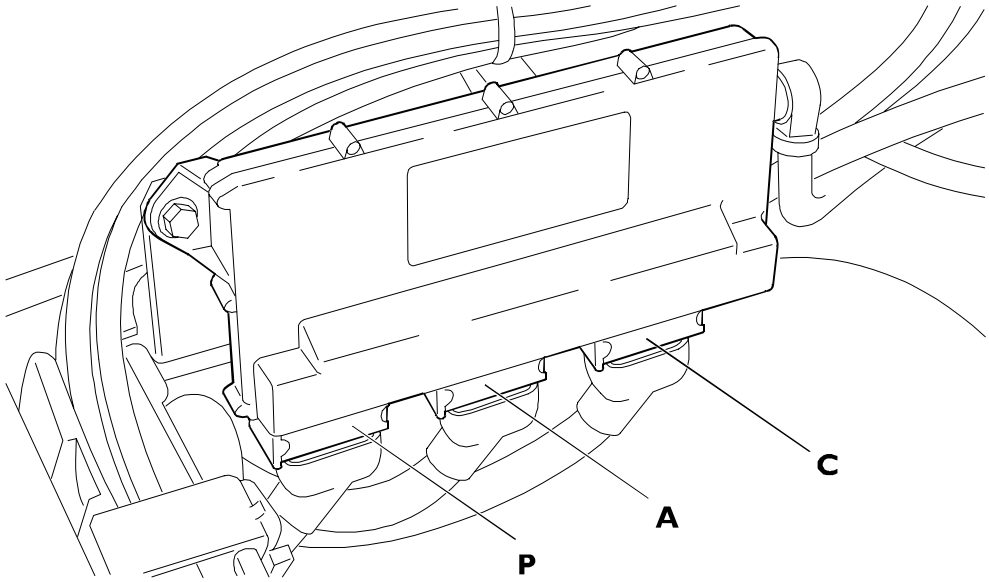
TERMINAL BOARD (ELECTRICAL CIRCUIT PASSAGE)

5.1.1.4 MET frame module control unit

The MET processes information on the electronic/electronic units on the frame (front lights/tail-lights and most of the sensors/actuators on the frame).

This information is sent to the IBC3 and the respective subsystems.

Figure 5.5



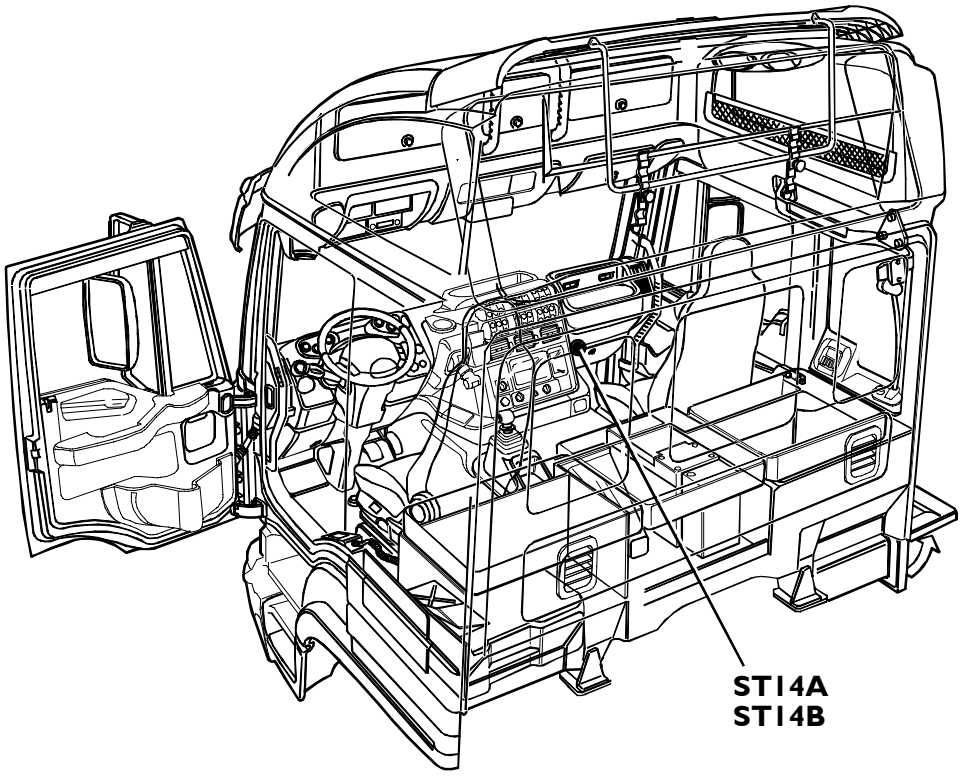
5.2 Bodybuilder connectors

The various connectors for bodybuilders are described in detail in the following paragraphs.

5.2.1 In the cab

The main connectors available for use by bodybuilders are ST14A and ST14B, which are blue.
They are located inside the cab, passenger side (see Figure 5.6); 21 contacts and 9 contacts. The terminal function is described in Table 5.1.

Figure 5.6



ST14 CONNECTORS INSIDE CAB (PASSENGER SIDE)

21 pin connector (brown): ST14A

Male coupling (AMP) parts picking number: 41200684
Female coupling (MCP 2.8) parts picking number: 504163549

Table 5.1 - Basic functions of 21 pin connector ST14A

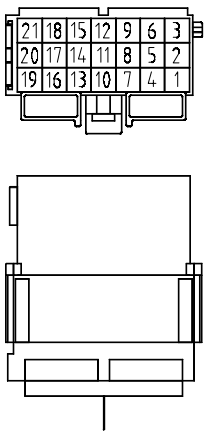
Pin	Description	Connections				Remarks
		Type	Cable code	Max. load	Connected to	
1	Engine cranking	INPUT	8892	10 mA	VCM X3-27	Connected to ground = engine cranking (the signal must be permanently active for the starter motor to turn) Open circuit = no action
2	Engine stopping	INPUT	0151	10 mA	VCM X3-26	Connected to ground = engine shutdown (a short activation period is sufficient to stop the engine Open circuit = no action
3	Service brake	OUTPUT	1165	200 mA	VCM X1-13	Service brake pressed indicator signal 0 V = service brake not pressed +24 V = service brake pressed
4	Vehicle stationary	OUTPUT	5515	200 mA	IBC3 E-15	Vehicle parked indicator signal 0 V = vehicle in motion +24 V = vehicle parked
5	Handbrake	OUTPUT	6656	200 mA	VCM X1-10	Handbrake engaged indicator signal 0 V = parking brake not engaged +24 V = parking brake engaged
6	Not connected					
7	Vehicle speed	OUTPUT	5540	10 mA	M/DTCO B7	Pulse signal
8	Engine status	OUTPUT	7778	200 mA	IBC3 E-14	Engine status indication signal (information D+) 0 V = engine off +24 V = engine running
9	Neutral	OUTPUT	8050	200 mA	VCM X1-7	Gearbox in neutral indicator signal 0 V = neutral not engaged +24 V = neutral engaged
10	Reverse gear	OUTPUT	2268	200 mA	IBC3 E-16	Reverse engaged indicator signal 0 V = reverse engaged +24V = reverse not engaged
11	K15	POWER	8871	3A	IBC3 B-1	K15 (ignition-operated power point)
12	Cruise Control Set+	INPUT	8156	10 mA	VCM X3-33	CC Set+ input signal Circuit open = Set+ not activated Connection to ground = Set+ activated

Table 5.1 - (Continued) Basic functions of 21 pin connector ST14A

Pin	Description	Connections				Remarks
		Type	Cable code	Max. load	Connected to	
13	Cruise Control Set-	INPUT	8157	10 mA	VCM X3-32	CC Set- input signal Circuit open = Set- not activated Connection to ground = Set- activated
14	Cruise Control OFF	INPUT	8154	10 mA	VCM X3-30	CC OFF input signal Circuit open = OFF not activated Connection to ground = OFF activated
15	Cruise Control RES	INPUT	8155	10 mA	VCM X3-31	CC RES input signal Circuit open = RES not activated Connection to ground = RES activated
16	Cruise Control driver/BB	INPUT	0158	10 mA	VCM X3-49	CC activation from driver's cockpit or by body-builder Open circuit = CC controlled from driver's cockpit Connected to ground = CC controlled by bodybuilder (BB)
17	Ground	POWER	0000	10A	Wiring	Ground
18	PdF 1sw	INPUT	0131	10 mA	VCM X3-47 EM X3-5	PTO mode 1 Open circuit = PTO mode 1 not activated Connected to ground = PTO mode 1 activated
19	PdF 2sw	INPUT	0132	10 mA	VCM X3-46 EM X3-6	PTO mode 2 Open circuit = PTO mode 2 not activated Connected to ground = PTO mode 2 activated
20	PdF 3sw	INPUT	0123	10 mA	VCM X3-45 EM X3-7	PTO mode 3 Open circuit = PTO mode 3 not activated Connected to ground = PTO mode 3 activated
21	K30	POWER	7772	10 A fuse	IBC3 B-9	K30 (positive from TGC)

In the position shown in Figure 5.6 there is the female half of connector ST14A, connected to the rest of the IVECO cab wiring harness.
The "female" half of connector ST14A is on the cables side with the following pinout Figure 5.7.

Figure 5.7



ST14A VIEWED FROM THE CABLE SIDE (FEMALE SUPPLIED WITH VEHICLE CAB WIRING HARNESS)

9 pin connector (yellow): ST14B

Male coupling parts picking number: 41200681
Female coupling parts picking number: 504163549

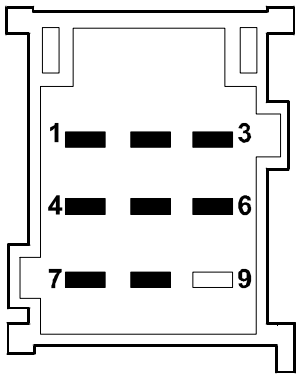
Table 5.2 - Basic functions of 9 pin connector ST14B

Pin	Description	Connections				Remarks
		Type	Cable code	Max. load	Connected to	
1	Second speed limiter	INPUT	0172	10 mA	VCM X3-13	Second speed limiter activation Open circuit = second speed limiter not activated Connected to 24V = second speed limiter activated
2	Not used					
3	Clutch status	OUTPUT	9963	200 mA	VCM X1-12	Clutch activated indicator signal Open circuit = clutch not activated Connection to ground = clutch activated
4	PTS	OUTPUT	5542	200 mA	VCM X1-14	PTS = programmable speed threshold 0 V = PTS not activated +24 V = PTS activated
5	Hazard lights	INPUT	1113	10 mA	IBC3 E4	Connected to ground = hazard lights on Open circuit = no action
6	For future use					
7	For future use					
8	Engine speed signal	OUTPUT	5587	10 mA	ECM 33	Pulse signal
9	K58: Exterior lighting power line	OUTPUT	3333	5 A	IBC3 E24	0 V = lights off +24 V = lights on (parking, low beams, high beams)

The female coupling of connector ST14B connected to the rest of the IVECO wiring is located in the portion indicated in Figure 5.8.

The female coupling of ST14B is present on the wiring side with the following pin arrangement (Figure 5.8).

Figure 5.8



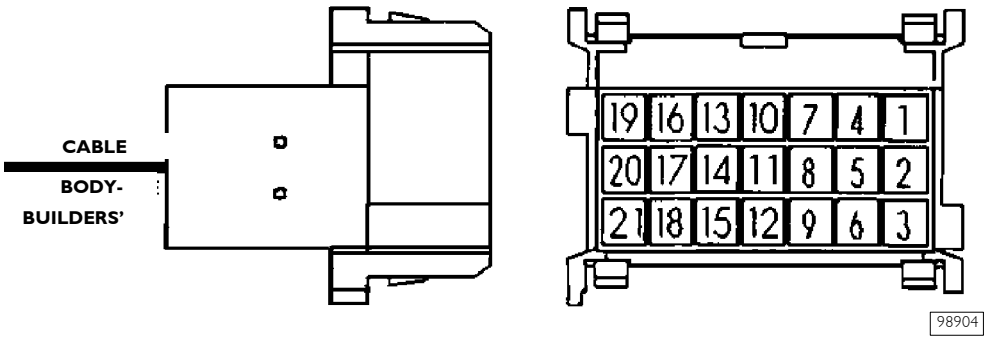
0051309t

ST14B VEW OF PINOUT SIDE

To take the signals required by the conversion it is necessary to procure (from the IVECO Service Network) the "male" half of connector ST14A and ST14B (spares P/N can be obtained from drawing n° 41200692) to which a wire can be connected for each of the 21 pins (Figure 5.9) the functions of which are described in the previous pinout.

Avoid all types of connections to the female connector which could create situations of danger with risks for the on-board systems, compromising running safety and proper operation of the vehicle and causing damage that is not covered by the contractual IVECO warranty.

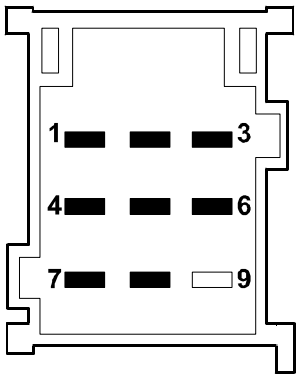
Figure 5.9



ST14B VIEW OF BODYBUILDERS' CABLE SIDE

The guarantee of a connection made according to standards is assured in the case of a complete connection (Figure 5.10).

Figure 5.10



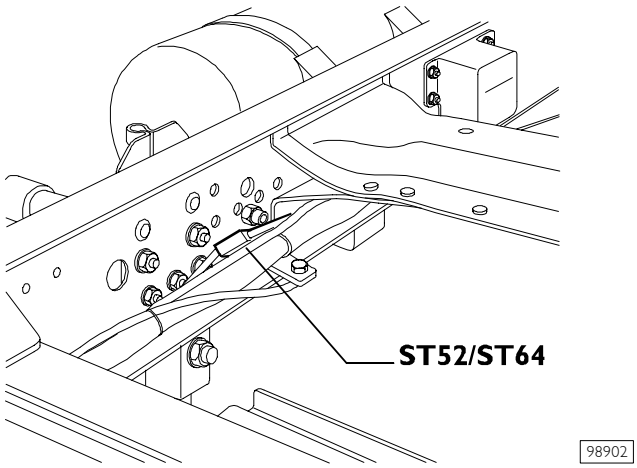
ST14B VIEW FROM CAB SIDE

5.2.2 On frame

The following connectors are provided on the chassis:

- ST 52 (ST 81 in previous range)
- ST 64 (for specific use by customer)
- ST 90 (PTO connection, manual transmission) / ST 67 (PTO connection, from EuroTronic gearbox) still present but destined for unused modifications
- ST 91 connector for PTO1
- ST 92 connector for PTO2
- ST 93 connector for PTO3

Figure 5.11



TERMINAL PART OF CHASSIS: CONNECTORS ST52 / ST64 (RIGHT HAND SIDE CLOSE TO REAR AXLE)

Table 5.3 - ST52 (see Figure 5.11)

Terminal	Description	Wire number	Max. load	Connected to	Remarks
1	K15 for BB	8871	10A	RFCJ1/A-2	K15 for BB, output is short-circuit protected
2	Free				For future use
3	K58; external lights	3333	5A	RFCJ2/A-06	0 V = lights off [1]) +24 V = lights on
4	Second speed limiter (adjusted to 30 km/h)	0172		RFCJ2/B-11	Second speed limiter activated [SL] Wire open = 2nd SL not activated Ground = 2nd SL active

[1]) +24 V when:

- K15 OFF and side markers on
- K15 ON and side markers on
- K15 ON and lights on (dipped beam and main beam)

Table 5.4 - ST64 (see Figure 5.11)

5-pin connector

For general use by bodybuilders: four terminals in the 15-pole connector can be used for the trailer (72010).

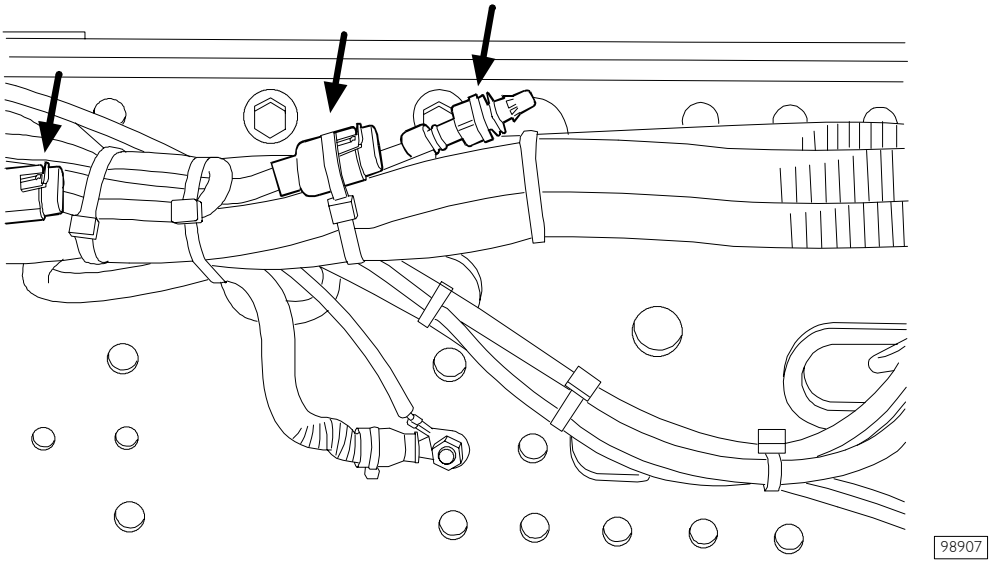
Terminal	Description	Circuit code	Connected to (Source/Destination)	Circuit description
1	-	8021	terminal 15, 72010	15-pole power, terminal pin 10
2	-	7021	terminal 14, 72010	15-pole power, terminal pin 12
3	-	6021	terminal 10, 72010	15-pole power, terminal pin 14
4	K15	8075	ST52/1 E RFC J1/A02	
5	-	8075	terminal 11, 72010	15-pole power, terminal pin 11

Table 5.5 - ST91 (right-hand side near transmission, see Figure 5.12)

Terminal	Description	Wire number	Max. load	Connected to	Remarks
1	PTO counter-reaction	6131	-	EM X3-8	PTO feedback signal Wire open = PTO not engaged Ground = PTO engaged
2	PTO control	9131	1,6 A	EM X1-1	For electrical PTO activation 0 V = solenoid valve not activated +24 V = solenoid valve activated
3	PTO enablement	0391	-	EM X3-11	PTO sensor may be disabled/may be disabled Wire open = PTO not engaged Ground = PTO engaged
4	Ground	0000	11 A		Ground (ground to middle of chassis)

1) Two input conditions can be detected:
Condition 1 = Wire open
Condition 2 =Ground
Active signal condition selected via EASY
Used only for pressure switch detection with Multipower PTO and Engine PTO.
Can be used as additional digital input for other applications managed by MUX PTO control.

Figure 5.12



ST 91/92/93

Table 5.6 - ST92 (right-hand side near transmission, see Figura 5.12)

Terminal	Description	Wire number	Max. load	Connected to	Remarks
1	PTO counter-reaction	6132	-	EM X3-9	PTO feedback signal Wire open = PTO not engaged Ground = PTO engaged
2	PTO control	9132	1,6 A	EM X1-3	For electrical PTO activation 0 V = solenoid valve not activated +24 V = solenoid valve activated
3	PTO enablement	0392	-	EM X3-12	PTO sensor may be disabled/may be disabled Wire open = PTO not engaged Ground = PTO engaged
4	Ground	0000	11 A		Ground (ground to middle of chassis)

1) Two input conditions can be detected:
Condition 1 = Wire open
Condition 2 = Ground
Active signal condition selected via EASY
Used only for pressure switch detection with Multipower PTO and Engine PTO.
Can be used as additional digital input for other applications managed by MUX PTO control.

Table 5.7 - ST93 (right-hand side near transmission, see Figura 5.12)

Terminal	Description	Wire number	Max. load	Connected to	Remarks
1	PTO counter-reaction	6133	-	EM X3-10	PTO feedback signal Wire open = PTO not engaged Ground = PTO engaged
2	PTO control	9123	1,6 A	EM X1-6	For electrical PTO activation 0 V = solenoid valve not activated +24 V = solenoid valve activated
3	PTO enablement	0393	-	EM X3-16	PTO sensor may be disabled/may be disabled Wire open = PTO not engaged Ground = PTO engaged
4	Ground	0000	11 A		Ground (ground to middle of chassis)

1) Two input conditions can be detected:
Condition 1 = Wire open
Condition 2 = Ground
Active signal condition selected via EASY
Used only for pressure switch detection with Multipower PTO and Engine PTO.
Can be used as additional digital input for other applications managed by MUX PTO control.

ST 94 features a similar structure to the previous three connectors, but currently it is not used.

5.2.3 Truck/trailer connectors

Two connectors are provided for connecting the trailer (see Figura 5.13):

- 15-pin (72010) for electrical devices in general
- 7-pin (72006) for vehicles with EBS, or 5-pin for vehicles with ABS + EBL.

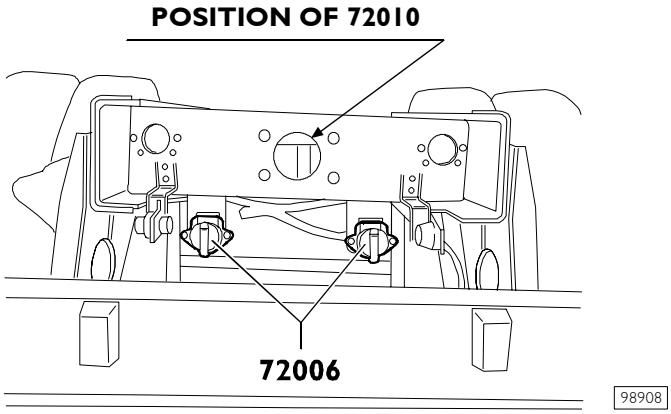
15-pin plug for connecting the trailer:

Terminal	Code	Maximum load	Transversal cross-section	Uso
		A	mm^2	
1	1180	6	0.75	left trailer indicator
2	1185	6	0.75	right trailer indicator
3	2283	6	0.75	rear foglight
4	0000	11	2.5	ground
5	3339	6	0.75	right rear marker/left trailer light
6	3330	6	0.75	left hand rear marker lights / right hand trailer light
7	1179	6	0.75	trailer brake light
8	2226	6	0.75	rear fog lights
9	7790	11	2.5	ADR, button 30
10	6021	11	1.0	towards ST64 pin 3
11	8075	11	1.0	towards ST64 pin 5
12	7021	11	1.0	towards cable penetration B pin 19
13	0000	11	1.0	ground
14	8081	11	1.0	towards ST64 pin 2
15	9021	11	1.0	towards ST64 pin 1

Remarks

Use connector ST64 described in paragraph 5.3.2 for connecting to terminals 10, 11, 14, 15.
Figure 5.13 shows truck connectors. The arrangement is similar and located behind the cab on tractors.

Figure 5.13



TRUCK TRAILER CONNECTORS

5.3 Electrical circuit modifications

CAN line wires and electric/electronic devices must not be modified.

IVECO recommends not to change the other electrical circuits and wiring harnesses either. Any modifications on the system will reduce quality and safety characteristics. Bodybuilders must use genuine IVECO spare parts if changes to the electrical system are inevitable. IVECO cannot be liable for system malfunctioning following the instructions contained in this chapter.

5.3.1 Introduction

The instructions provided by IVECO in paragraph 2.1.1 also refer to Multiplex system wiring harnesses. IVECO connectors and the respective terminals cannot be modified. Avoid connecting and disconnecting the chassis ECU connectors for more than three times to prevent damaging the gel which ensures tightness of the connections.

5.3.2 Wiring harness length

In Trakker, the MUX CAN line and the traditional electrical wires form a single wiring harness. Consequently, it is not possible to replace only the CAN line or the electrical wiring where the electrical system is formed by both types of wires.

The wire length (CAN line + electrical wires) may not be correct when repositioning ECUs connected to the Multiplex system.

- excessive
- not sufficient

If the length is excessive, fold the wires without forming rings (this could cause undesired electromagnetic effects). Preferably use figures of 8. The wire which connects the ECUs is very stiff. For this reason, it must be replaced when it cannot be folded.

Replace the wiring if the length is not sufficient. Use genuine IVECO spare parts (contact the IVECO service network).

The wire length depends on three factors: wheelbase, overhang and crossmember position. Select one of the variants in the table for replacing the wiring if the modification involves a wheelbase/overhang which already exists in the IVECO range or, conversely, choose the closest variant for the solution (the table only shows the currently produced wheelbase/overhang combinations).

In all cases, the CAN wiring itself cannot be changed. All modifications are expressly forbidden by IVECO.

Table 5.8

Vehicle	Variant table	Variant	Wheelbase	Rear overhang
4x2 With cab	5.9	1	3800	1195
		2	4200	1195
		3	4500	1780
		4	4800	2365
		5	5100	2365
4x4 - 180/190 W With cab		1	3800	1195
		2	4200	1195
		3	4500	1780
4x4 - 190 W/P With cab		1	3800	1217,5
		2	4200	1217,5
		3	4500	1802,5
6x4 - 260 With cab	5.10	2	3500/1380	1225
		2	3500/1380	1495
		3	3820/1380	1495
		4	4200/1380	1135
		5	4500/1380	1990
		5	4800/1380	1495
		6	5100/1380	1585
6x4 - 260/P With cab		2	3500/1395	1217,5
		2	3500/1395	1487,5
		3	3820/1395	1487,5
		4	4200/1395	1127,5
		5	4500/1395	1982,5
		6	4800/1395	1487,5
		7	5100/1395	1577,5
6x4 - 380 With cab		1	3500/1380	1495
		2	3500/1380	1495
		3	3820/1380	1495
		4	4200/1380	2080
		5	4500/1380	2080
6x4 - 380/P With cab		1	3200/1395	1487,5
		2	3500/1395	1487,5
		3	3820/1395	1487,5
		4	4200/1395	2072,5
		5	4500/1395	2072,5
6x6 - 260 W With cab		11	3500/1390	1490
		11	3820/1390	1490
6x6 - 380 W With cab		11	3500/1390	1490
		11	3820/1390	1850
6x4 - 260 B With cab		2	3500/1380	685
		3	3820/1380	685
		4	4200/1380	685

Table 5.8 - (continued)

Vehicle	Variant table	Variant	Wheelbase	Rear overhang
6x4 - 260 B/P With cab	5.10	1	3200/1395	767,5
		2	3500/1395	767,5
		3	3820/1395	767,5
6x4 - 380 B With cab		1	3200/1380	1495
		2	3500/1380	1495
		3	3820/1380	1495
8x4x4 - 340 With cab		7	4250/1380	685
		8	4750/1380	1225
		9	5020/1380	1495
		10	5820/1380	1225
8x4x4 - 340/P With cab		7	4250/1395	767,5
		8	4750/1395	1217,5
		9	5020/1395	1487,5
		10	5820/1395	1217,5
8x4x4 - 410 With cab		7	4250/1380	1225
		8	4750/1380	1225
		9	5020/1380	1495
		10	5820/1380	1225
8x4x4 - 410/P With cab		7	4250/1395	767,5
		8	4750/1395	1217,5
		9	5020/1395	1487,5
		10	5820/1395	1217,5
8x8x4 With cab		1	4750/1400	855
8x4x4 - 340 B With cab		7	4250/1380	1000
		8	4750/1380	1000
		9	5020/1380	1000
8x4x4 - 340 B/P With cab		7	4250/1395	992,5
		8	4750/1395	992,5
		9	5020/1395	992,5
8x4x4 - 410 B With cab		7	4250/1380	1225
		8	4750/1380	1225
		9	5020/1380	1225
4x2 Tractor	5.9	1	3500	1025
		1	3800	1025
4x4 Tractor		1	3800	1025
6x4 - 440 Tractor	5.10	1	3200/1380	705
6x4 - 440 /P Tractor		1	3200/1395	777,5
6x4 - 720 Tractor		1	3200/1380	785
6x4 - 720 /P Tractor		1	3200/1395	777,5
6x6 Tractor		1	3500/1390	780

See Table 5.1 and Table 5.2 to match the variants to the corresponding wiring components.

Table 5.9

variant	ID number	
05	4124 2363 KZ	50-8330
04	4124 2362 KZ	50-8330
03	4124 2361 KZ	50-83330
02	4124 2367 KZ	50-8330
01	4124 2359 KZ	50-8330

Table 5.10

variant	ID number	
11	4124 2415 KZ	50-8330
10	4124 2425 KZ	50-8330
09	4124 2422 KZ	50-83330
08	4124 2420 KZ	50-8330
07	4124 2417 KZ	50-8330
06	4124 2391 KZ	50-8330
05	4124 2389 KZ	50-8330
04	4124 2386 KZ	50-8330
03	4124 2383 KZ	50-83330
02	4124 2380 KZ	50-8330
01	4124 2376 KZ	50-8330

This does not refer to modifications which do not involve the Multiplex wiring (CAN line + electrical wires). For example, when extending the overhang without changing the position of the RFC, simply replace the electrical wires leading from the RFC to the respective utilities.

IVECO recommends replacing traditional electrical wires with genuine components instead of modifying them.

Contact IVECO for particularly difficult cases. Send a diagram with the chassis dimensions and the new ECU positions.

5.3.3 Repositioning ECUs

IVECO recommends to avoid modifications which entails moving ECUs. Follow the instructions below if repositioning ECUs is unavoidable:

- ECUs must be positioned on the chassis or in the cab and secured with a fastening similar to the original one (i.e. bracket). To avoid malfunctions, the ECU in the chassis must not be turned (e.g. to avoid water ingress). Consequently, the original orientation must be preserved.
- ECUs must not be fitted on the subframe;
- the cover must always be refitted;
- avoid subjecting ECUs to knocks from debris and stones from the road when travelling.

5.3.4 Disconnecting ECUs

Operations which do not comply with the instructions specified by IVECO or made by non qualified personnel can cause severe damage to on-board systems, effect driving safety and correct operation of the vehicle and cause considerable damage which is not covered by warranty.

Follow the instructions below carefully before disconnecting an ECU:

- turn the ignition key to off, if it is inserted;
- switch off the additional heaters and wait for the end of the cooling down cycle (the warning light in the button will go out);
- turn on the map reading lights located in the middle of the header rail;
- open the TGC (master switch), where fitted, with the switch arranged in the cab. The map reading lights will go out when the circuit breaker is open;
- isolate the battery by disconnecting the battery cables: disconnect the negative terminal first followed by the positive terminal;
- disconnect the ECU.

5.4 FMS

The fleet management systems are integrated in the VCM.

The data, transmitted according to the FMS standard (visit www.fms-standards.com), can be acquired in real time by an on-board computer.

As a result of processing the data, it is possible:

- to obtain information about the operating conditions of the vehicle (times, distances, fuel consumption, etc.);
- analyse the operating conditions of the engine and the use of the braking system;
- analyse the distribution of the distances travelled, speed, frequency of stops and starts.

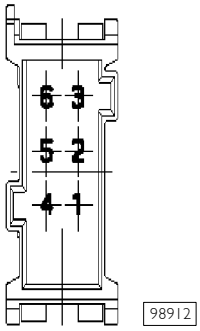
The installation of the on-board computer, hardware and software for data processing and management is the task of the ICT installer.

CAN connector for onboard PC wiring

The CAN connection on board the vehicle (ST40) is of the 6 way JUNIOR POWER TIMER HOUSING - AMP ORDER- NO 1- 965640-1 type.

The wiring connector to the onboard PC (see Figure 5.14) must be 6 way AMP TAB HOUSING, 2.8 mm - AMP ORDER- NO 1-965641-1 mating connector (use contact type Junior Power Timer - P/N 962882-1 or 962882-2).

Figure 5.14



The pin function is shown in the following table:

Table 5.11 - Connector ST40/02 pins

Pin	Description
1	Reserved for future IVECO use
2	CAN_H (white wire in vehicle wiring harness)
3	CAN_L (green wire in vehicle wiring harness)
4	Reserved for future IVECO use
5	Ground
6	Not used

Pin 5 (Ground) must not be used unless required by the onboard computer.

The VDI must be connected to the computer via the CAN line. The specifications are shown in Table 5.12.

Table 5.12 - Characteristics of the CAN line

Physical level	Unshielded twisted pair to ISO std. 11898 (SAE J1929/11). Termination of internal bus to cable with 120 Ω resistor.
Data link level	2.0B CAN, 250 Kbit/sec. Identifier and multipacket message management format to SAE J1929/21.
Application level	Message and parameter to SAE J1939/71.

Onboard computer installation, wiring downstream of the connector ST40/2, hardware and software for managing and processing data is the responsibility of the bodybuilder.

Information on computerised system installers who are qualified by IVECO can be found at IVECO Dealers.

NOTE Information provided by VDI includes the message "FMS standard interface" which identifies the standard revision supported by the VDI interface fitted on the vehicle. A VDI prior to FMS standard implementation is fitted if the message is not present. All functions illustrated in this paragraph will equally be available in this case.

SECTION 6

Special instructions for -SCR- exhaust system

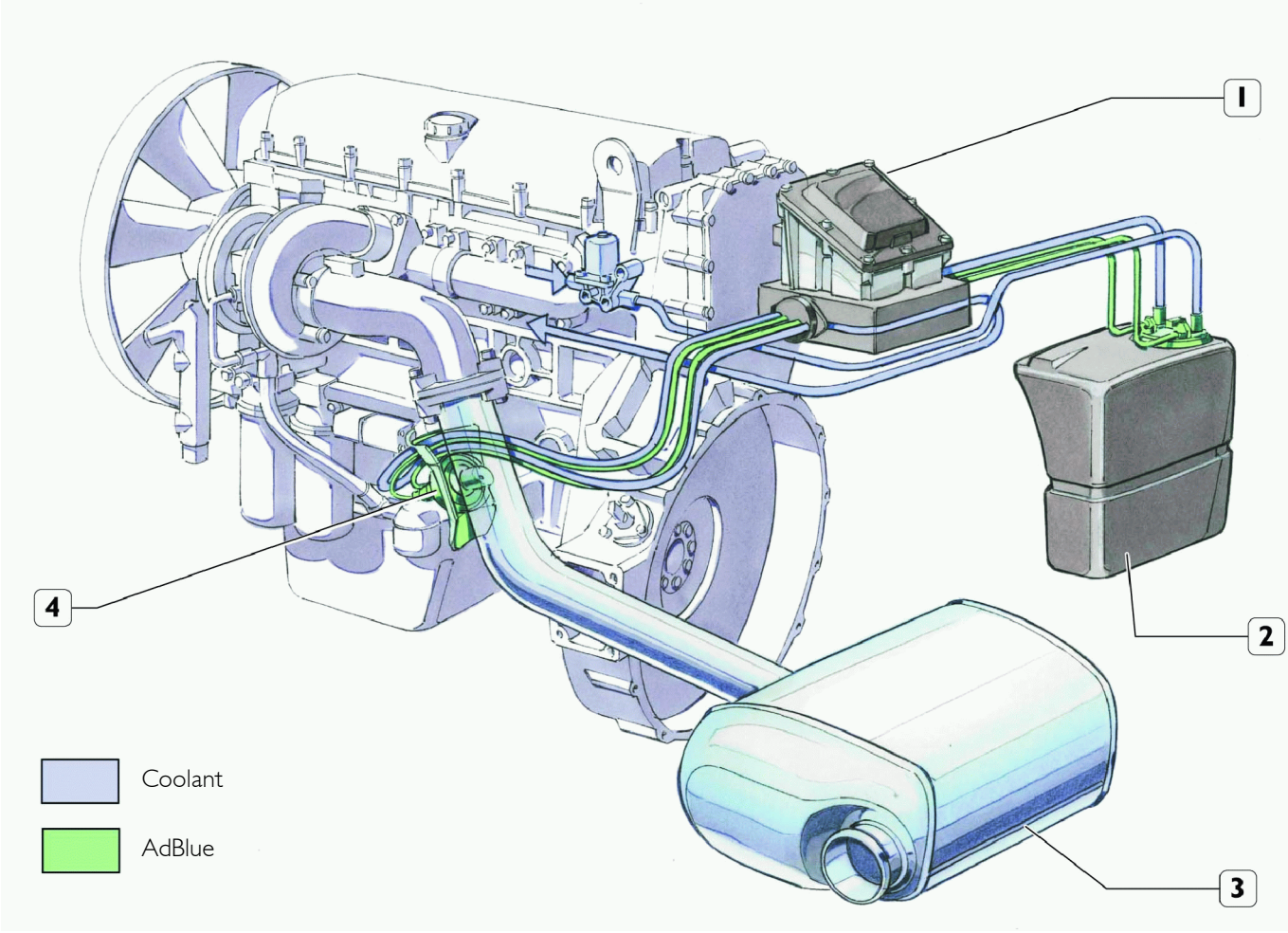
6.1 General specifications

This chapter contains important information on the **-SCR- exhaust systems** fitted on the IVECO series (EuroCargo - Stralis - Trakker).

In order to comply with Euro4 Euro5 standards, IVECO has chosen the SCR (selective catalyst reduction) system to reduce the nitrogen oxide (NOx) emissions produced by exhaust gas.

SCR is an exhaust gas post-treatment system that uses a catalyzer which, by means of a chemical reaction, transforms NOx nitrogen oxyde into nitrogen and water. This chemical reaction is produced by an additive called AdBlue (a solution of urea + water).

Figure 6.1



1. Pumping module - 2. Urea tank - 3. Catalyzer - 4. Dosing module

6.2 The nitrogen oxide catalytic reduction principle. AdBlue

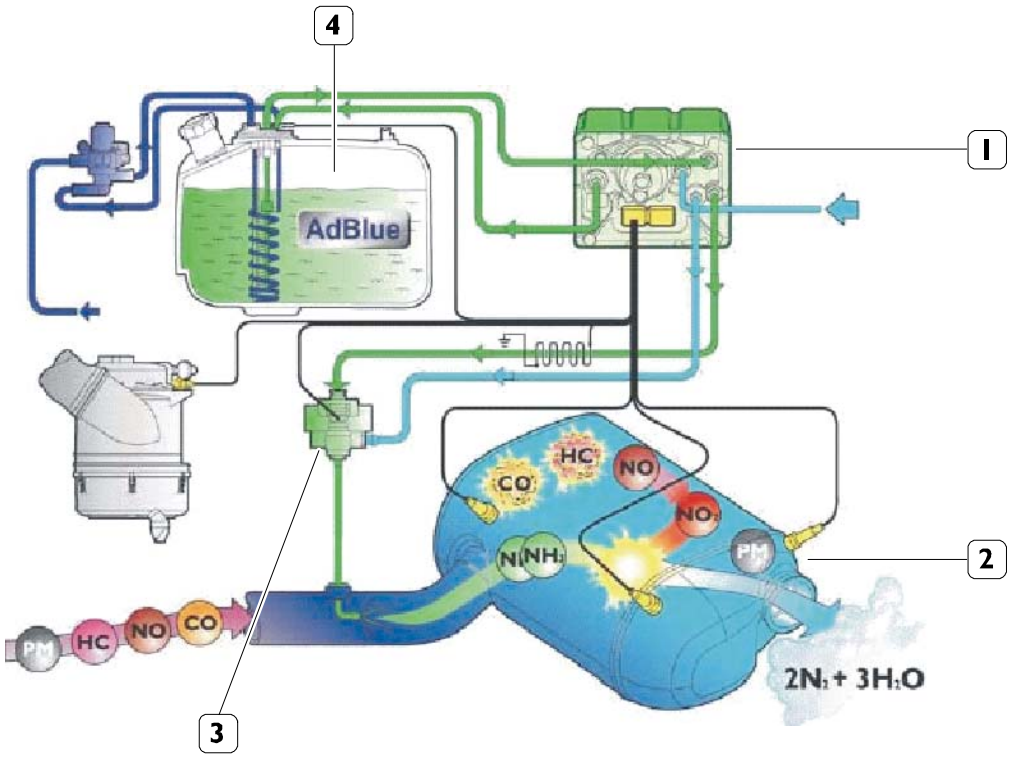
The additive is sent from a dedicated reservoir by means of supply module (1) to dosing module (3), which injects AdBlue into the exhaust pipe.

The mixture thus obtained is then fed to the SCR catalyzer that transforms the NOx into nitrogen and water.

Post-treatment is based on a simple principle: the chemical reaction of ammonia NH_3 with nitrogen oxides NO and NO_2 produces two harmless substances: water vapour H_2O and nitrogen N_2.

The whole system is managed by an electronic control unit.

Figure 6.2

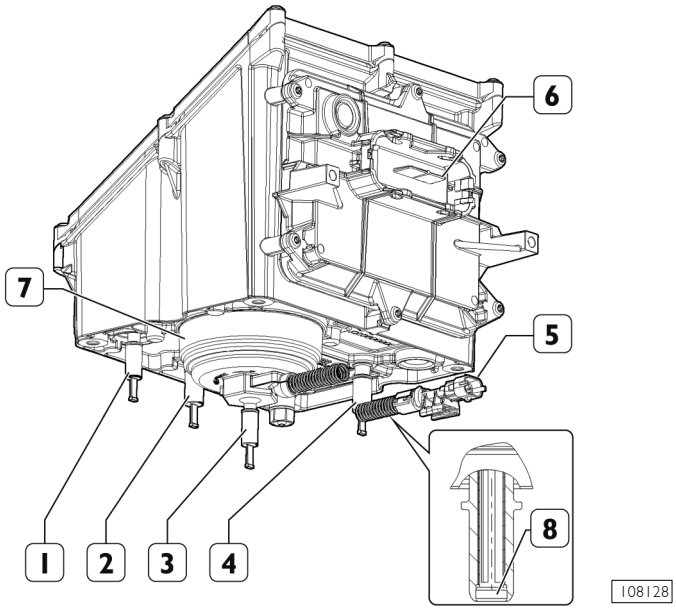


1. Pumping module - 2. Catalyzer - 3. Dosing module - 4. AdBlue reservoir

Main system components

Pump module

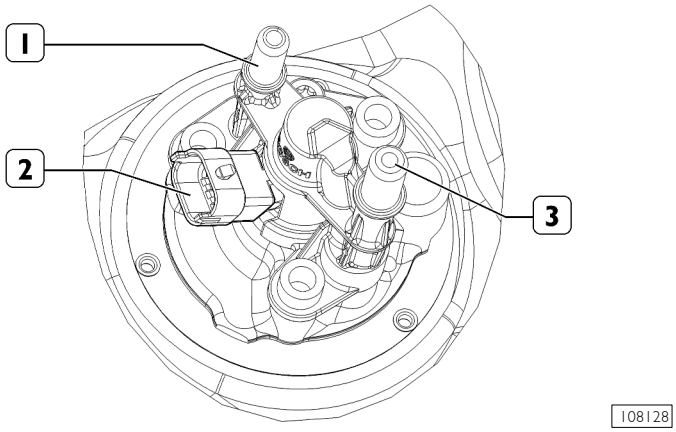
Figure 6.3



1. Ad Blue return Pipe to the tank - 2. Ad Blue return Pipe from Dosing module - 3. Ad Blue solution outlet - 4. Ad Blue solution inlet - 5. Electrical connection - 6. DCU control unit - 7. Filter - 8. Pre-filter.

Dosing module

Figure 6.4

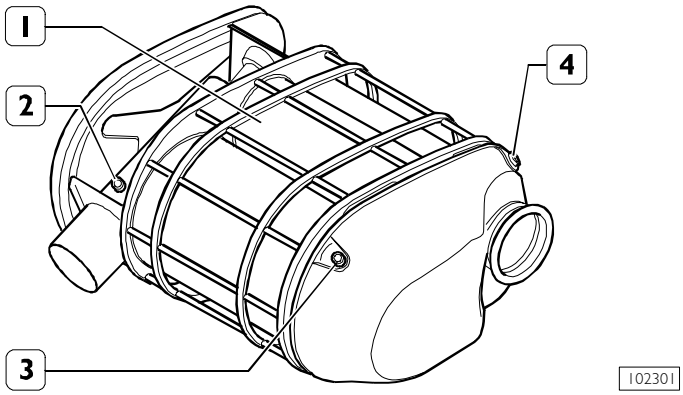


1. Ad Blue inlet - 2. Electrical connection - 3. Ad Blue outlet

Its task is to meter the Ad Blue solution sent to the exhaust pipe upstream of catalyst.

Catalyzer

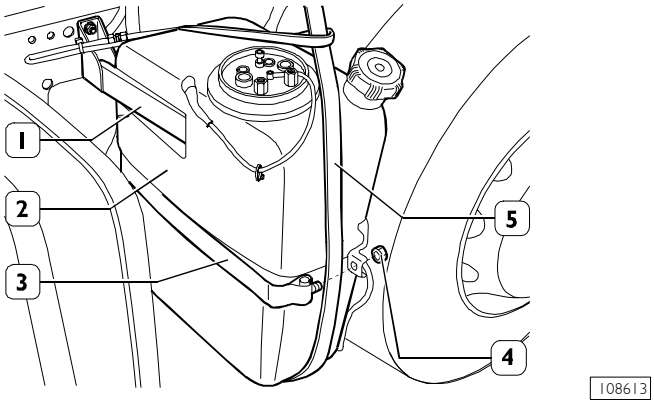
Figure 6.5



Catalyst (1), equipped with sound-proofing material, replaces the exhaust silencer.
Inside the catalyst, the exhaust gas nitric oxides are, by reacting with ammonia, converted into free nitrogen and water vapour.
Temperature sensors (2 and 3) and nitric oxide detecting sensor (4) are fitted onto catalyst (1).

AdBlue reservoir

Figure 6.6

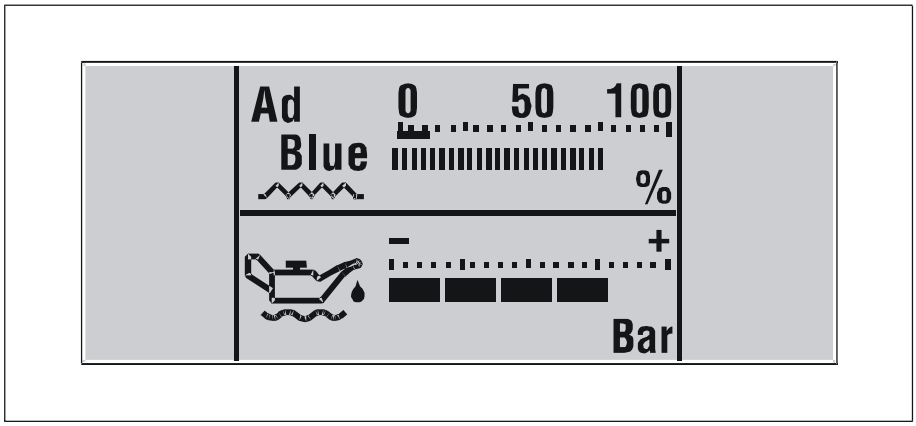


Remove nut (4) and dismantle elastic strap (3) securing tank (2). Sling tank (2) with appropriate cable (5) and hook it to the hoister.

6.3 On-board instruments

The on board diagnostic system checks the tank level continuously and informs the driver on the current quantity.

Figure 6.7



6.4 Distribution of the ecological additive AdBlue

The 'AdBlue' denomination is recognized internationally; it is an aqueous solution consisting of high purity urea according to the DIN 70070 standard.

It is absolutely safe, non-toxic and non-flammable.

AdBlue manufacturers can assure the product direct distribution to the transporters with huge vehicle fleets, and the oil companies are also planning to install AdBlue pumps close to diesel fuel pumps within a short time.

To ensure a capillary distribution and an adequate service level as of now, Iveco supplies AdBlue to its dealer network.

Figure 6.8

114735

Figure 6.9

114736

Figure 6.10

114737

6.5 Specifications for installation and removal

The instructions that follow are intended for the AdBlue injection system of the Bosch DENOX2 type, within the SCR system.

If Bodybuilders make changes to the frame, the following procedures must be followed under all circumstances:

- disassembly: disconnect the hydraulic connectors first and then the electric connectors;
- assembly: connect the electric connectors first and then the hydraulic connectors.

Compliance with this assembly/disassembly procedure will ensure that AdBlue does not come into contact with the electric connectors.

6.5.1 Operations for positioning the AdBlue tank

Figure 6.11

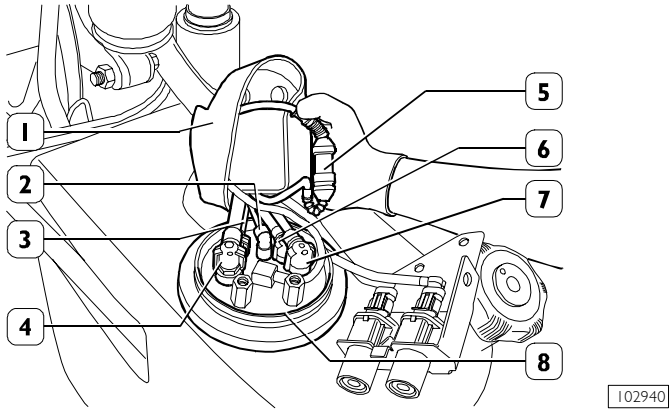
116720

As regards the AdBlue tank, ensure that:

- the tank ventilation pipe is never closed;
- the reservoir must contain at least 5 l of AdBlue at the end of each operation to ensure the dosing module is cooled;
- after each operation, the tank does not contain more than 85% of AdBlue (corresponding to the max reading of the level sensor) with respect to the tank total volume, so as to guarantee enough room for AdBlue to expand during freezing at temperatures below -11 °C;
- The urea reservoir must be made out of plastic or stainless steel;
- The reservoir and its float must not be separated.

- when fitting equipment onto the chassis, there is enough room for the AdBlue fill gun (1, Figure 6.12) to fit completely and correctly into the tank filler.

Figure 6.12



1. Cover - 2. Breather pipe - 3. AdBlue pipe - 4. Engine coolant pipe - 5. Electrical connection - 6. AdBlue pipe - 7. Engine cooling pipe - 8. Level gauge

Figure 6.13

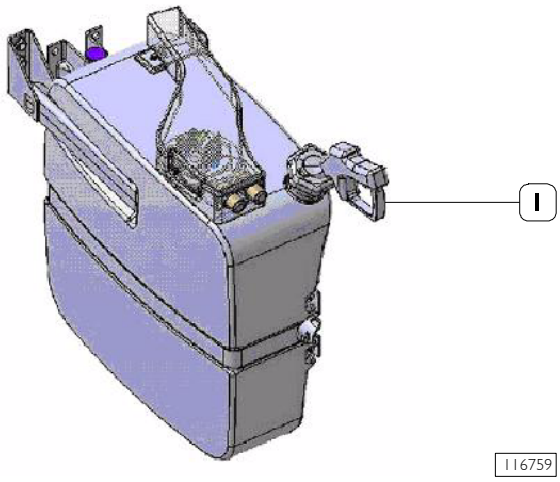
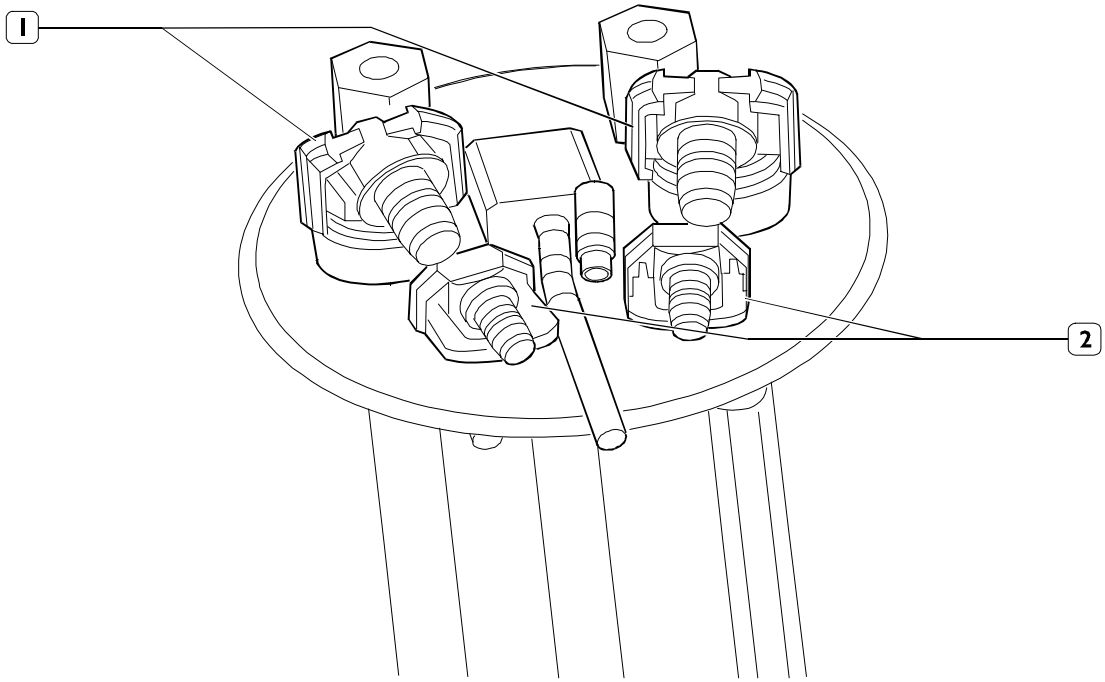


Figure 6.14



1. H_2O infeed/outfeed connectors for AdBlue heater - 2. AdBlue infeed/outfeed connectors

The temperature and level sensors are connected to the DCU (Dosing Control Unit); the level sensor is specific to each type of tank, therefore its dimensions cannot be modified.

6.5.2 Operations on AdBlue pipes and heating water

As far as the pipes connecting reservoir, supply module and dosing module are concerned, ensure that:

- the connection pipes between the AdBlue reservoir and the supply module (delivery or inlet line or return or return line) must be 5 m long at most and the maximum pressure drop must be 100 hPa under all circumstances;
- the connection pipes between the supply module and the dosing module (delivery or pressure line and return or cooling line) must be 3 m long at most and the maximum pressure drop must be 100 hPa under all circumstances;

The pipes may only be modified using the "Voss" fittings described in Table 6.13.

Table 6.13 - AdBlue

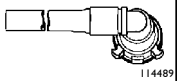
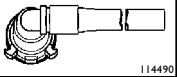
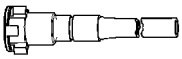
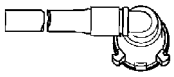
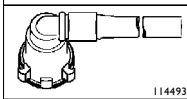
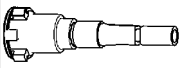
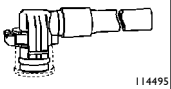
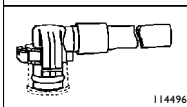
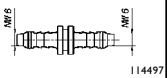
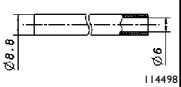
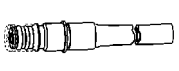
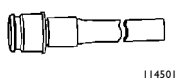
	VOSS/IVECO Teil -Nr: Part -No: Codice:	**Benennung**	**Itemname**	**Descrizione**	**Description**	**Descripción**
 114489	5 4 62 07 00 00 4128 3733 EZ 50-7499	Winkelkupplung SV241 5/16" Ausführung links; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV241 5/16" VERSION LEFT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV241 5/16" VERSIONE SINISTRA; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 5/16" VERSION GAUCHE, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV241 5/16" VERSION IZQUIERDA; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114490	5 4 62 07 56 00 4128 3734 EZ 50-7499	Winkelkupplung SV241 5/16" Ausführung rechts; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV241 5/16" VERSION RIGHT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV241 5/16" VERSIONE DESTRA; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 5/16" VERSION DROITE, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV241 5/16" VERSION DERECHA; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114490	5 4 62 08 89 00 4128 3735 EZ 50-7499	Geradekupplung SV241 5/16"; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	CONNECTOR SV241 5/16"; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO SV241 5/16"; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD SV241 5/16", AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION SV241 5/16"; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114492	5 4 62 23 26 00 4128 3736 EZ 50-7499	Winkelkupplung SV241 3/8" Ausführung links; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV241 3/8" VERSION LEFT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV241 3/8" VERSIONE SINISTRA; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 3/8" VERSION GAUCHE, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV241 3/8" VERSION IZQUIERDA; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114493	5 4 62 23 49 00 4128 3737 EZ 50-7499	Winkelkupplung SV241 3/8" Ausführung rechts; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV241 3/8" VERSION RIGHT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV241 3/8" VERSIONE DESTRA; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 3/8" VERSION DROITE, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV241 3/8" VERSION DERECHA; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114494	5 4 62 23 50 00 4128 3738 EZ 50-7499	Geradekupplung SV241 3/8"; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	CONNECTOR SV241 3/8"; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO SV241 3/8"; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD SV241 3/8", AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION SV241 3/8"; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114495	5 4 62 24 70 00 4128 3739 EZ 50-7499	Winkelstecker SV246 NG 8 Öffnungselement weiss; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV246 NG 8 RELEASE CLIP WHITE; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV246 NG 8 ELEMENTO DI APERTURA BIANCO; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 8/16" ELEMENT D'OUVERTURE BLANC, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV246 NG 8 ELEMENTO DE APERTURA BLANCO; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114496	5 4 62 27 60 00 4128 370 EZ 50-7499	Winkelstecker SV246 NG 8 Öffnungselement schwarz; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	ELBOW CONNECTOR SV246 NG 8 RELEASE CLIP BLACK; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO ANGOLO SV246 NG 8 ELEMENTO DI APERTURA NERO; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD ANGLE SV241 8/16" ELEMENT D'OUVERTURE NOIR, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION EN ANGULO SV246 NG 8 ELEMENTO DE APERTURA NEGRO; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114497	5 4 66 12 06 49 4128 3741 EZ 50-7499	Set Verbinder MLT; 1 Verbinder NW6 2 1-Ohr Schellen 1 Montageanleitung ACHTUNG Montageanleitung 9 1 77 00 02 20 beachten	SET CONNECTOR MLT; 1 CONNECTOR NW6 2 RETAINING CLIP 1 ASSEMBLY INSTRUCTION ATTENTION TAKE NOTICE OF ASSEMBLY INSTRUCTION 9 1 77 00 02 20	SET DI RACCORDO; 1 RACCORDO NW6 2 FASCETTA 1 ISTRUZIONE DI MONTAGGIO PRESTARE ATTENZIONE A L'ISTRUZIONE DI MONTAGGIO 9 1 77 00 02 20	SET DE RACCORD ; 1 RACCORD NVV6 2 COLLIER 1 INSTRUCTION DE MONTAGE RESPECTER LES INSTRUCTIONS DE MONTAGE 9 1 77 00 02 20	JUEGO DE CONEXION; 1 RACOR NW6 2 ABRAZADERAS 1 INSTRUCCIONES DE MONTAJE PRESTAR ATENCION A LAS INSTRUCCIONES DE MONTAJE 9 1 77 00 02 20
 114498	5 4 64 11 16 00 4128 3742 EZ 50-7499	Rohr MLT 8.8x1.4 PA0.2 Länge 10m	TUBE MLT 8.8x1.4 PA0.2 LENGTH 10m	TUBO MLT 8.8x1.4 PA0.2 LUNGHEZZA 10m	TUBE MLT 8.8x1.4 PA0.2 LONGUEUR 10m	TUBO MLT 8.8x1.4 PA0.2 LONGITUD 10 m
 114500	5 4 62 35 74 00 4128 3743 EZ 50-7499	Stecker Trennstelle; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	CONNECTOR SECTION POINT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO PIASTRA DI SEZIONAMENTO; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD PLAQUE DE SECTIONNEMENT, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION CHAPA DE SEPARACION; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA
 114501	5 4 62 35 75 00 4128 3744 EZ 50-7499	Kupplung Trennstelle; mit MLT 8.8x1.4 PA 0.2 Länge 3m und Quetschhülse	CONNECTOR SECTION POINT; WITH MLT 8.8x1.4 PA0.2 LENGTH 3m AND COMPRESSED SLEEVE	RACCORDO PIASTRA DI SEZIONAMENTO; CON MLT 8.8x1.4 PA0.2 LUNGHEZZA 3m E BOCCOLA PRESSATA	RACCORD PLAQUE DE SECTIONNEMENT, AVEC MLT 8.8x1.4 PA0.2 LONGUEUR 3 m ET BAGUE PRESSEE	CONEXION CHAPA DE SEPARACION; CON MLT 8.8x1.4 PA0.2 LONGITUD 3 m Y BOQUILLA PRENSADA

Table 6.1 - (cont.) Cooling water

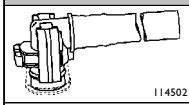
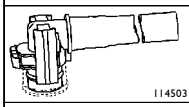
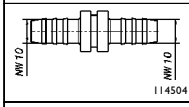
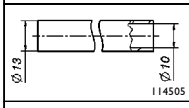
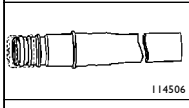
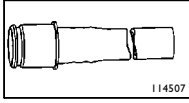
	VOSS/IVECO Teil -Nr: Part -No: Codice:	Benennung	Itemname	Descrizione	Description	Descripción
 114502	5 4 62 28 42 00 4128 3745 EZ 50-7499	Winkelstecker SV246 NG 12 Öffnungselement weiss; mit Rohr Grilamicl 13x1.5 Länge 3m	ELBOW CONNECTOR SV246 NG 12 RELEASE CLIP WHITE; WITH GRILAMID TUBE 13x1.5 LENGTH 3m	RACCORDO ANGOLO SV246 NG 12 ELEMENTO DI APERTURA BIANCO; CON TUBO GRILAMID 13x1.5 LUNGHEZZA 3m	RACCORD ANGLE SV246 NG 12 ELEMENT D'OUVERTURE BLANC, AVEC TUBE GRILAMID 13x1.5 LONGUEUR 3m	CONEXION EN ANGULO SV246 NG 12 ELEMENTO DE APERTURA BLANCO; CON TUBO GRILAMID 13x1.5 LONGITUD 3 m
 114503	5 4 62 29 49 00 4128 3746 EZ 50-7499	Winkelstecker SV246 NG 12 Öffnungselement blau; mit Rohr Grilamid 13x1,5 Länge 3m	ELBOW CONNECTOR SV246 NG 12 RELEASE CLIP BLUE; WITH TUBE GRILAMID 13x1.5 LENGTH 3m	RACCORDO ANGOLO SV246 NG 12 ELEMENTO DI APERTURA BLU; CON TUBO GRILAMID 13x1.5 LUNGHEZZA 3m	RACCORD ANGLE SV246 NG 12 ELEMENT D'OUVERTURE BLEU, AVEC TUBE GRILAMID 13x1.5 LONGUEUR 3m	CONEXION EN ANGULO SV246 NG 12 ELEMENTO DE APERTURA AZUL; CON TUBO GRILAMID 13x1.5 LONGITUD 3 m
 114504	0 0 26 11 50 00 4128 3747 EZ 50-7499	Verbinder NW 10	CONNECTOR NW 10	RACCORDO NW 10	RACCORD NW 10	CONEXION NW 10
 114505	5 4 64 19 08 00 4128 3748 EZ 50-7499	Rohr GRILAMID 13x1.5 Länge 10m	TUBE GRILAMID 13x1.5 LENGTH 10m	TUBO GRILAMID 13x1.5 LUNGHEZZA 10m	TUBE GRILAMID 13x1.5 LONGUEUR 10m	TUBO GRILAMID 13x1.5 LONGITUD 10 m
 114506	5 4 62 35 76 00 4128 3749 EZ 50-7499	Stecker Trennstelle; mit Rohr Grilamid 13x1,5 Länge 3m	CONNECTOR SECTION POINT; WITH TUBE GRILAMID 13x1.5 LENGTH 3m	RACCORDO PIASTRA DI SEZIONAMENTO; CON TUBO GRILAMID 13x1,5 LUNGHEZZA 3m	RACCORD PLAQUE DE SECTIONNEMENT AVEC TUBE GRILAMID 13x1,5 LONGUEUR 3m	CONEXION CHAPA DE SEPARACION; CON TUBO GRILAMID 13x1,5 LONGITUD 3 m
 114507	5 4 62 35 77 00 4128 3750 EZ 50-7499	Kupplung Trennstelle; mit Rohr Grilamid 13x1,5 Länge 3m	CONNECTOR SECTION POINT; WITH TUBE GRILAMID 13x1.5 LENGTH 3m	RACCORDO PIASTRA DI SEZIONAMENTO; CON TUBO GRILAMID 13x1,5 LUNGHEZZA 3m	RACCORD PLAQUE DE SECTIONNEMENT AVEC TUBE GRILAMID 13x1,5 LONGUEUR 3m	CONEXION CHAPA DE SEPARACION; CON TUBO GRILAMID 13x1,5 LONGITUD 3 m

Table 6.1 - (cont.) Corrugated pipe

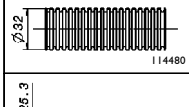
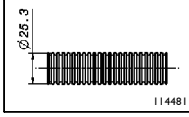
	VOSS/IVECO Teil -Nr: Part -No: Codice:	Benennung	Itemname	Descrizione	Description	Descripción
 114479	5 4 66 11 37 00 4128 3751 EZ 50-7499	Wellrohr NW37 Länge 3m	CORRUGATED HOSE NW37 LENGTH 3m	TUBO CORRUGATO NW37 LUNGHEZZA 3m	TUBE CANNELE NW37 LONGUEUR 3m	TUBO CORRUGADO NW37 LONGITUD 3 m
 114480	5 4 66 12 10 00 4128 3752 EZ 50-7499	Wellrohr NW26 Länge 3m	CORRUGATED HOSE NW26 LENGTH 3m	TUBO CORRUGATO NW26 LUNGHEZZA 3m	TUBE CANNELE NW26 LONGUEUR 3m	TUBO CORRUGADO NW26 LONGITUD 3 m
 114481	5 4 66 12 09 00 4128 3753 EZ 50-7499	Wellrohr NW22 Länge 3m	CORRUGATED HOSE NW22 LENGTH 3m	TUBO CORRUGATO NW22 LUNGHEZZA 3m	TUBE CANNELE NW22 LONGUEUR 3m	TUBO CORRUGADO NW22 LONGITUD 3 m

Table 6.1 - (cont.) Breather pipe

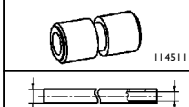
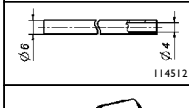
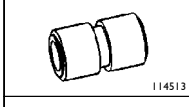
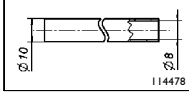
	VOSS/IVECO Teil -Nr: Part -No: Codice:	Benennung	Itemname	Descrizione	Description	Descripción
 114511	5 4 66 09 65 00 4128 3757 EZ 50-7499	Verbinder NW 6	CONNECTOR NW 6	RACCORDO NW6	RACCORD NW6	CONEXION NW6
 114512	5 4 64 19 09 00 4128 3758 EZ 50-7499	Rohr 6x1 PA12PHLY Länge 10m	TUBE 6x1 PA12PHLY LENGTH 10m	TUBO 6x1 PA12PHLY LUNGHEZZA 10m	TUBE 6x1 PA12PHLY LONGUEUR 10m	TUBO 6x1 PA12PHLY LONGITUD 10 m
 114513	5 4 66 10 21 00 4128 3759 EZ 50-7499	Verbinder NW 10	CONNECTOR NW 10	RACCORDO NW10	RACCORD NW10	CONEXION NW10
 114478	5 4 64 19 10 00 4128 3760 EZ 50-7499	Rohr 10x1 PA12PHLY Länge 10m	TUBE 10x1 PA12PHLY LENGTH 10m	TUBO 10x1 PA12PHLY LUNGHEZZA 10m	TUBE 10x1 PA12PHLY LONGUEUR 10m	TUBO 10x1 PA12PHLY LONGITUD 10 m

Table 6.1 - (cont.) Tools

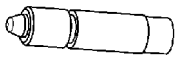
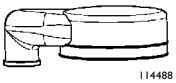
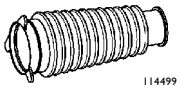
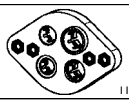
	VOSS/IVECO Teil -Nr: Part -No: Codice:	Benennung	Itemname	Descrizione	Description	Descripción
 114482	5 9 94 52 14 00 4128 3770 EZ 50-7499	Kunststoffrohr Montagezange	NYLON TUBE MOUNTING PLIERS	PINZA DI MONTAGGIO PER TUBO PLASTICA	PINCE DE MONTAGE POUR TUBE PLASTIQUE	ALICATES DE MONTAJE PARA TUBO DE PLASTICO
	5 9 94 71 53 49 4128 3771 EZ 50-7499	Spannbacken für Rohr MLT 8.8x1.4	CLAMPING JAWS FOR TUBE MLT 8.8x1.4	MORSA PER TUBO MLT 8.8x1.4	GRIFFE DE SERRAGE POUR TUBE MLT 8.8x1.4	MORDAZA PARA TUBO MLT 8.8x1.4
 114484	5 9 94 65 41 00 4128 3772 EZ 50-7499	Spannbacken für Rohr GRILAMID 13x1.5 (08/ 010/ 012/ 013)	CLAMPING JAWS FOR TUBE GRILAMID 13x1.5 (08/ 010/ 012/ 013)	MORSA PER TUBO GRILAMID 13x1.5 (08/ 010/ 012/ 013)	GRIFFE DE SERRAGE POUR TUBE GRILAMID 13x1.5 (08/ 010/ 012/ 013)	MORDAZA PARA TUBO GRILAMID 13x1.5 (08/ 010/ 012/ 013)
 114485	5 9 94 71 55 00 4128 3773 EZ 50-7499	Werkzeugeinsatz Aufnahme für Verbinder NW6 (Harnstoff)	TOOLING INSERT COLLET FOR CONNECTOR NW 6 (AD-BLUE)	INSERTO STAMPO ALLOGIAMENTO PER CONNETTORI NW6 (UREA)	EMPREINTE MOULE LOGEMENT CONNECTEURS NVV6 (UREE)	UTIL ESTAMPACION ALOJAMIENTO PARA CONEXIONES NW6 (UREA)
 114486	5 9 94 69 16 49 4128 3774 EZ 50-7499	Werkzeugeinsatz Aufnahme für Verbinder NW10 (Kühlwasser)	TOOLING INSERT COLLET FOR CONNECTOR NW 10 (COOLING WATER)	INSERTO STAMPO ALLOGIAMENTO PER CONNETTORI NW10 (AQUA DI RAFFREDDAMENTO)	EMPREINTE MOULE LOGEMENT CONNECTEURS NW10 (EAU DE REFROIDISSEMENT)	UTIL ESTAMPACION ALOJAMIENTO PARA CONEXIONES NW10 (AGUA DE REFRIGERACION)
 114487	5 9 94 71 56 00 4128 3775 EZ 50-7499	Aufweitdorn für Rohr MLT 8.8x1.4	WIDENING SPIKE FOR TUBE MLT 8.8x1.4	MANDRINO ALLARGATUBI MLT 8.8x1.4	MANDRIN A DUDGEONNER MLT 8.8x1.4	MANDRIL PARA AVELLANAR TUBOS MLT 8.8x1.4
	9 7 51 00 00 08	Klemmzange für Einohrschelle	CLAMPING PLIERS FOR CLIP RETAINER	MORSETTO PER FASCETTA	CLIP POUR COLLIER DE SERRAGE	UTIL PARA ABRAZADERAS
	5 9 94 84 72 00	Kunstoffrohr-Schneidezange	NYLON TUBE SCISSORS	TRONCHESE PER TUBO IN PLASTICA	TRICOISES POUR TUBE EN PLASTIQUE	CORTADOR DE TUBO DE PLASTICO
	5 9 94 84 74 00	Ersatzklinge für Kunstoffrohr-Schneidezange (2 Stück)	SPARE BLADE FOR NYLON TUBE SCISSORS	LAMA DI RICAMBIO PER TRONCHESE PER TUBO IN PLASTICA	LAME DE RECHANGE DE TRICOISES POUR TUBE EN PLASTIQUE	CUCHILLA DE RECAMBIO PARA CORTADOR DE TUBO DE PLASTICO

Table 6.1 - (cont.) Components

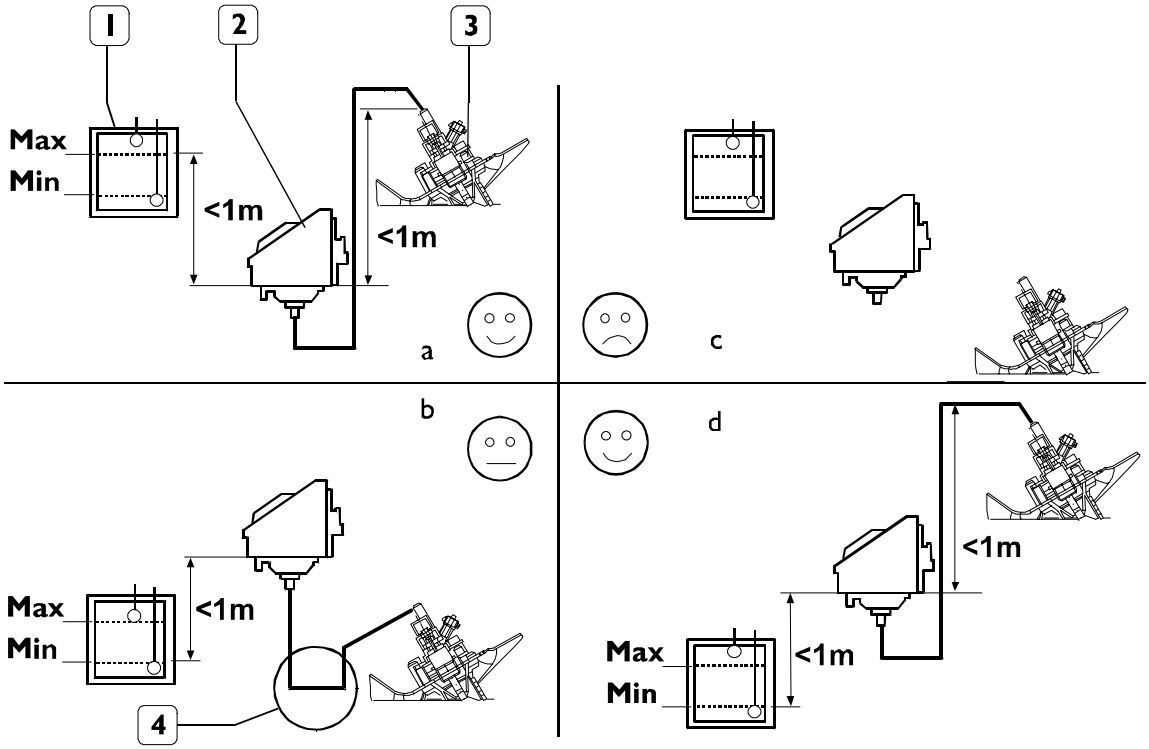
	VOSS/IVECO Teil -Nr: Part -No: Codice:	Benennung	Itemname	Descrizione	Description	Descripción
 114477	5 0 99 11 64 00 4128 3761 EZ 50-7499	Schutzkappe Tank 0°	PROTECTION CAP TANK 0°	CAPPA DI PROTEZIONE SERBATOIO 0°	CAPUCHON DE PROTECTION RESERVOIR 0°	COBERTURA DE PROTECCION DEPOSITO 0°
 114488	5 0 99 11 71 00 4128 3762 EZ 50-7499	Schutzkappe Tank 90°	PROTECTION CAP TANK 90°	CAPPA DI PROTEZIONE SERBATOIO 90°	CAPUCHON DE PROTECTION RESERVOIR 90°	COBERTURA DE PROTECCION DEPOSITO 90°
 114499	5 4 66 09 30 00 4128 3763 EZ 50-7499	Faltenbalg	CONVOLUTED RUBBER GAITER	SOFFIETTO	SOUFFLET	RESPIRADERO
 114508	5 4 66 09 64 00 4128 3764 EZ 50-7499	T-Stück für Wellrohr NW37	T-CONNECTOR FOR CORRUGATED HOSE NW37	DISTRIBUTORE A T PER TUBO CORRUGATO NW37	DISTRIBUTEUR EN T POUR TUBE ANNELE NW37	DISTRIBUIDOR EN T PARA TUBO CORRUGADO NW37
 114509	5 3 49 03 21 00 4128 3765 EZ 50-7499	Deckplatte Trennstelle	COVERPLATE SECTION POINT	PIASTRA DI COPERTURA PUNTO DI SEZIONAMENTO	PLAQUE DE COUVERTURE POINT DE SECTIONNEMENT	CHAPA DE COBERTURA PUNTO DE SEPARACION
 114510	5 3 49 03 20 49 4128 3766 EZ 50-7499	Grundplatte Trennstelle	BASE PLATE SECTION POINT	PIASTRA DI BASE PUNTO DI SEZIONAMENTO	PLAQUE DE BASE POINT DE SECTIONNEMENT	CHAPA DE BASE PUNTO DE SEPARACION

- When working on the pipes, it is compulsory to work in a completely dust-free environment to prevent dust reaching the injector.
- Restore all the pipe insulation (water and Urea pipes) to prevent freezing.

6.5.3 Altering the supply module position

If the supply module requires repositioning, scrupulously observe the instructions in Figure 6.15.
The module must be installed horizontally and on a rigid mount.

Figure 6.15

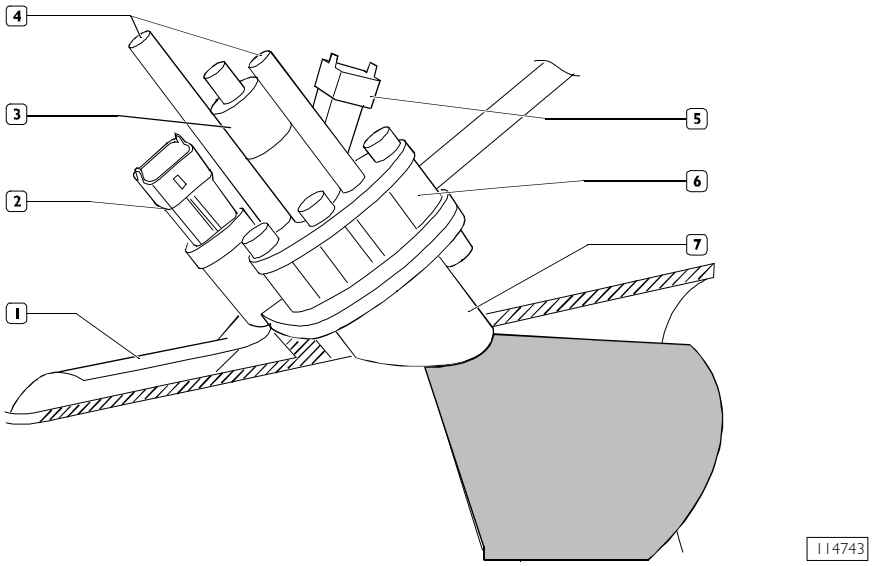


1. AdBlue reservoir - 2. Pumping module - 3. Dosing module - 4. Siphon compulsory

6.5.4 Operations on the dosing module

When the dosing module requires repositioning, note some important precautions.

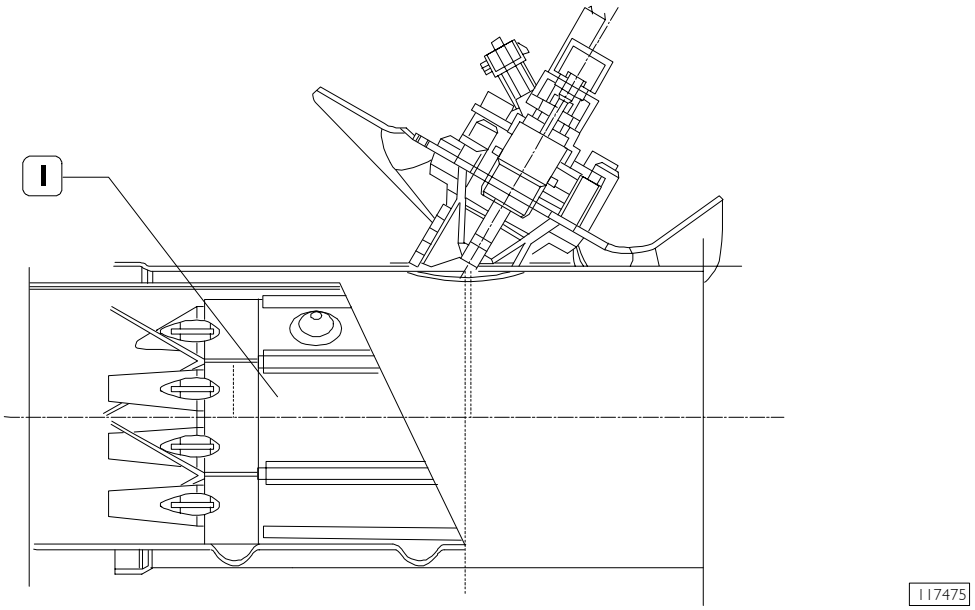
Figure 6.16



STRUCTURE OF THE MEASURING MODULE

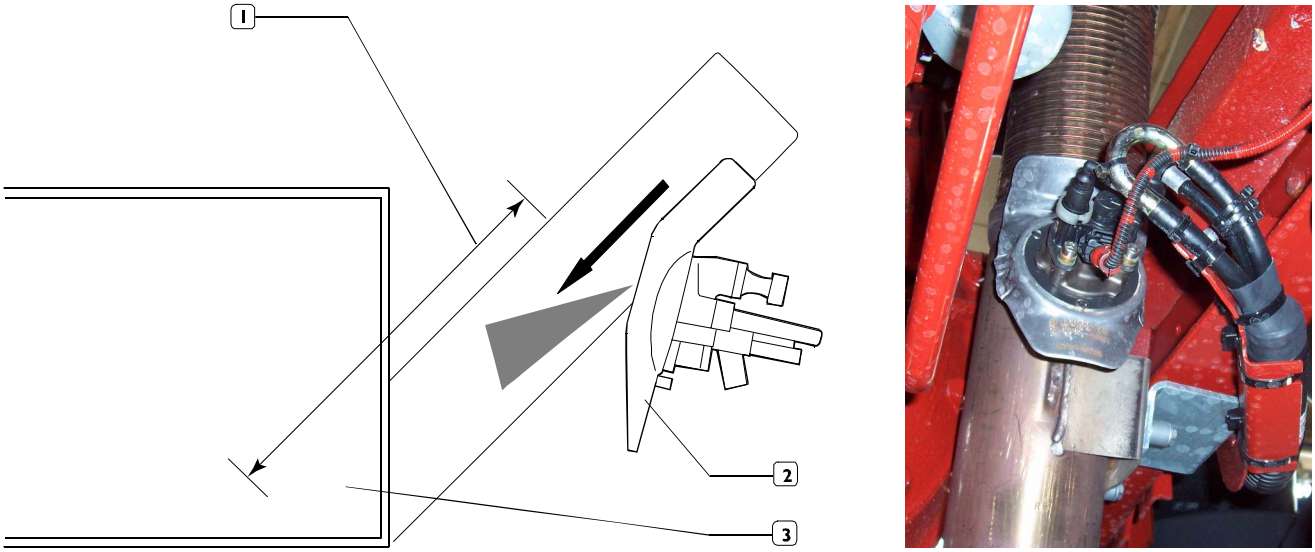
1. Heatshield - 2. Temperature sensor - 3. Valve holder - 4. AdBlue connectors - 5. Dosing valve - 6. Cooling adapter - 7. Insulation

Figure 6.17



- As regards the AdBlue piping connecting the tank (1), the supply module and the dosing module, ensure that:

Figure 6.18



114745

1. Exhaust gas pipe tract involved by the injection of the AdBlue solution - 2. Dosing Module position: -45° / 180° - Exhaust pipe low in at catalyst

The supply module:

- must not be fitted too near to the turbine to prevent it overheating;
- must not be fitted too near the catalytic converter input to prevent the build-up of carbon deposits.

NOTE If the dosing module is moved, the pipes and electrical wiring must be modified.

6.5.5 Operations on exhaust pipes

NOTE The exhaust pipe layout cannot be changed without the approval of IVECO.

The exhaust pipe can be modified paying attention to the following warnings:

- type approved (homologated) counter-pressures must be respected when determining the exhaust pipe route. Form bends with angles greater than 90° and radius of curvature greater than 2.5 times the pipe diameter. Keep the exhaust pipe far enough away from rubber or plastic parts and fit heat shields if necessary.
- It is not permitted to use pipes with diameters, thicknesses and materials other than those used for the original equipment.
- It is permitted to use hoses with limited lengths.

Electrical wiring

- It is only possible to lengthen cables for the temperature sensors.
- It is not possible to alter the length of the Nox sensor cable.