

# Chapter 11

## POWER TAKE OFF (P.T.O.)

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7. SIGNAL FOR ALLISON TRANSMISSION

## 1. TRANSMISSION P.T.O.

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When P.T.O. is necessary for body or equipment mounting to Hino vehicles, contact directly in the nearby transmission manufacturer as following or HMC or Hino authorized dealer.

- In case of the vehicle equipped Allison automatic transmission, contact to ALLISON Transmission Division (ATD) distributors or dealers.

## 2. SPLIT SHAFT P.T.O.

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Be sure to observe the following precautions to prevent malfunction of vehicle control system when installing split shaft P. T. O..

### **Precaution for Installing or Modifying Split Shaft P.T.O.**

Do not modify parking lever switch and buzzer off switch related to parking brake circuit and parking brake circuit. If modify them, the parking condition of the vehicle can not be confirmed, and so the vehicle control system may not operate properly.

Since the split shaft P.T.O. is used while the vehicle is parked, and therefore, do not modify the vehicle which can run during the split shaft P.T.O. operation.

Should connect the P.T.O. switch circuit to the common rail ECU circuit for diagnosis of P.T.O. operating condition.

Refer to "COMMON RAIL CIRCUIT" in Chapter 7 and "CONNECTORS" in Chapter 12 for the connection destination and used connector of P.T.O. switch 1.

The vehicle system will not operate properly because the vehicle speed sensor is judged to be faulty if the operating condition of the P.T.O. can not be confirmed.

Customizing common rail ECU is required when installing Split Shaft P.T.O., please consult HMC for the detail.

### 3. TRANSMISSION MODELS TO BE INSTALLED HINO'S VEHICLES

MODEL			NE8J	NJ8J	NV8J	NH8J
TRANSMISSION	AUTO	STD	Allison 2200HS (J08E-WU:230HP) Allison 2500RDS (J08E-VB:260HP)	Allison 2200HS (J08E-WU:230HP) Allison 2500RDS (J08E-VB:260HP)	Allison 3000RDS	Allison 3000RDS
		OPT	Allison 2200RDS Allison 2500HS  Allison 2200HS (J08E-VB:260HP) Allison 2500RDS (J08E-WU:230HP) Allison 3000RDS (J08E-VB:260HP)	Allison 2200RDS Allison 2500HS  Allison 2200HS (J08E-VB:260HP) Allison 2500RDS (J08E-WU:230HP) Allison 3000RDS (J08E-VB:260HP)	Allison 2500RDS Allison 2500HS Allison 3500RDS Allison 3000HS (J08E-VB:260HP)	Allison 3500RDS Allison 3000HS (J08E-VB:260HP)

### 4. OTHER NOTICES

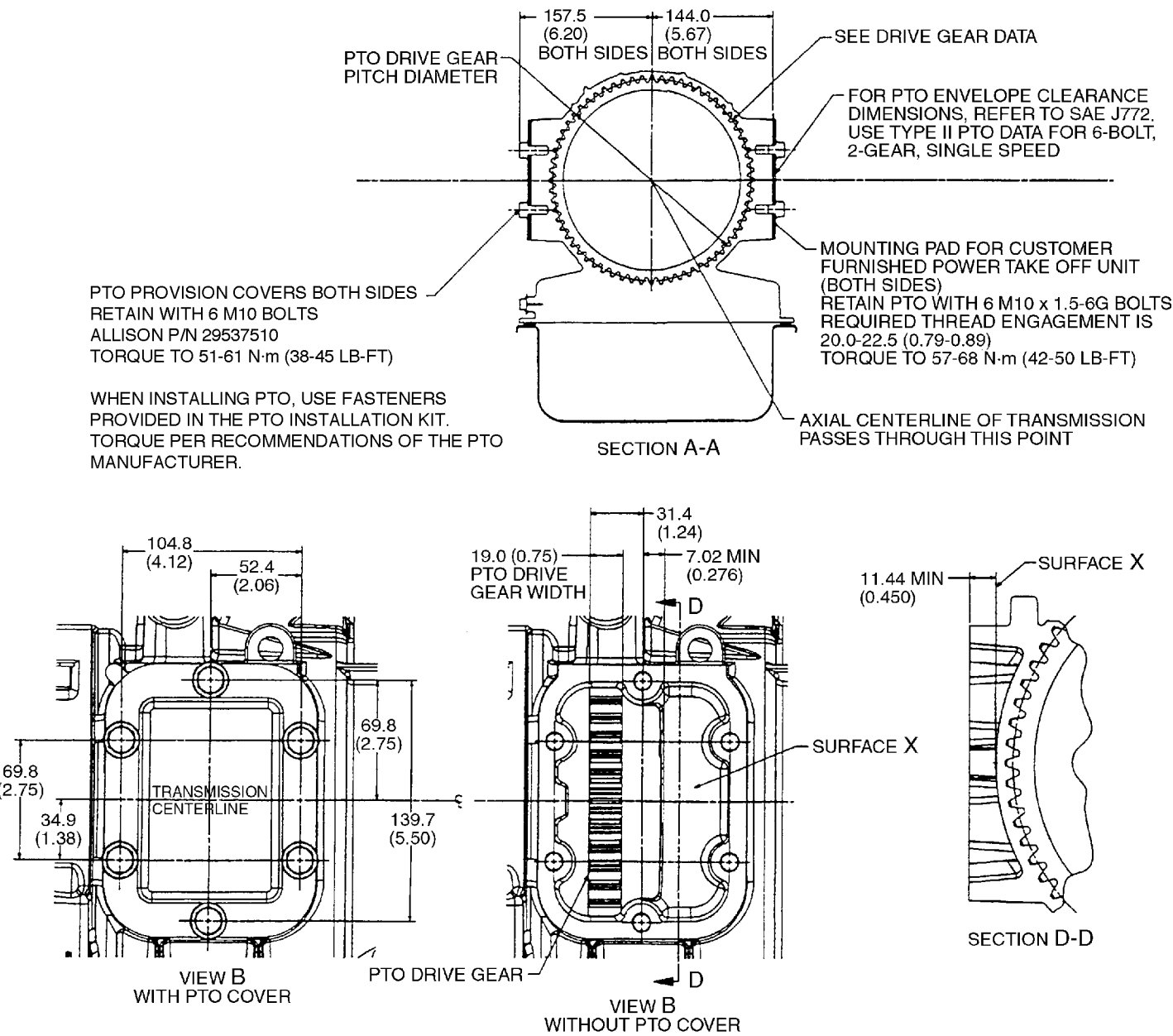
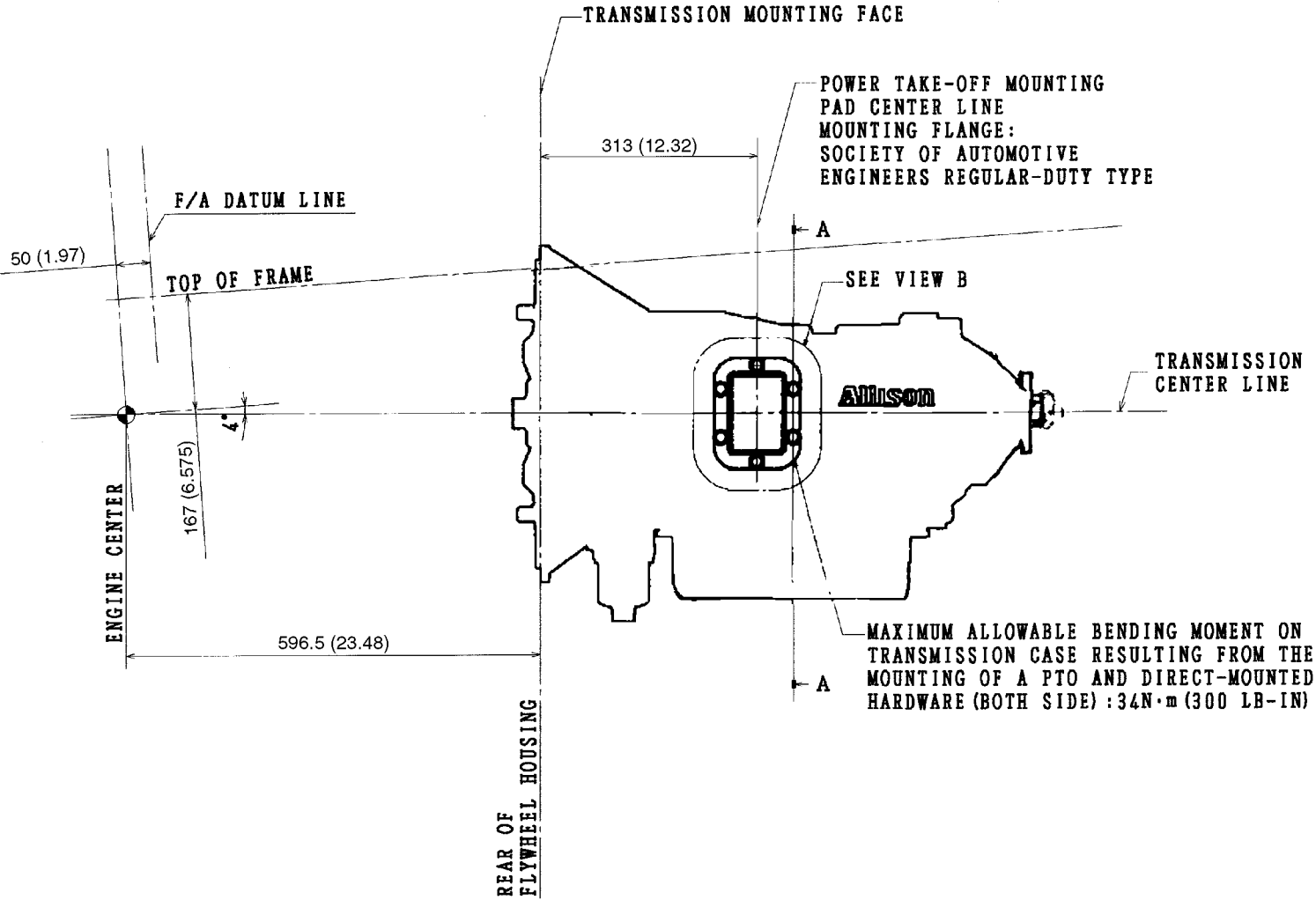
If a P.T.O. is installed make sure it works properly and meets the respective manufacturers guidelines for application, installation, and operation.

NOTE : 2200HS, 2500HS and 3000HS does not have P.T.O. gear.

5. MOUNTING POSITION OF TRANSMISSION P.T.O. ASSY

• TRANSMISSION MODEL : ALLISON 2200RDS

Unit : mm (in.)



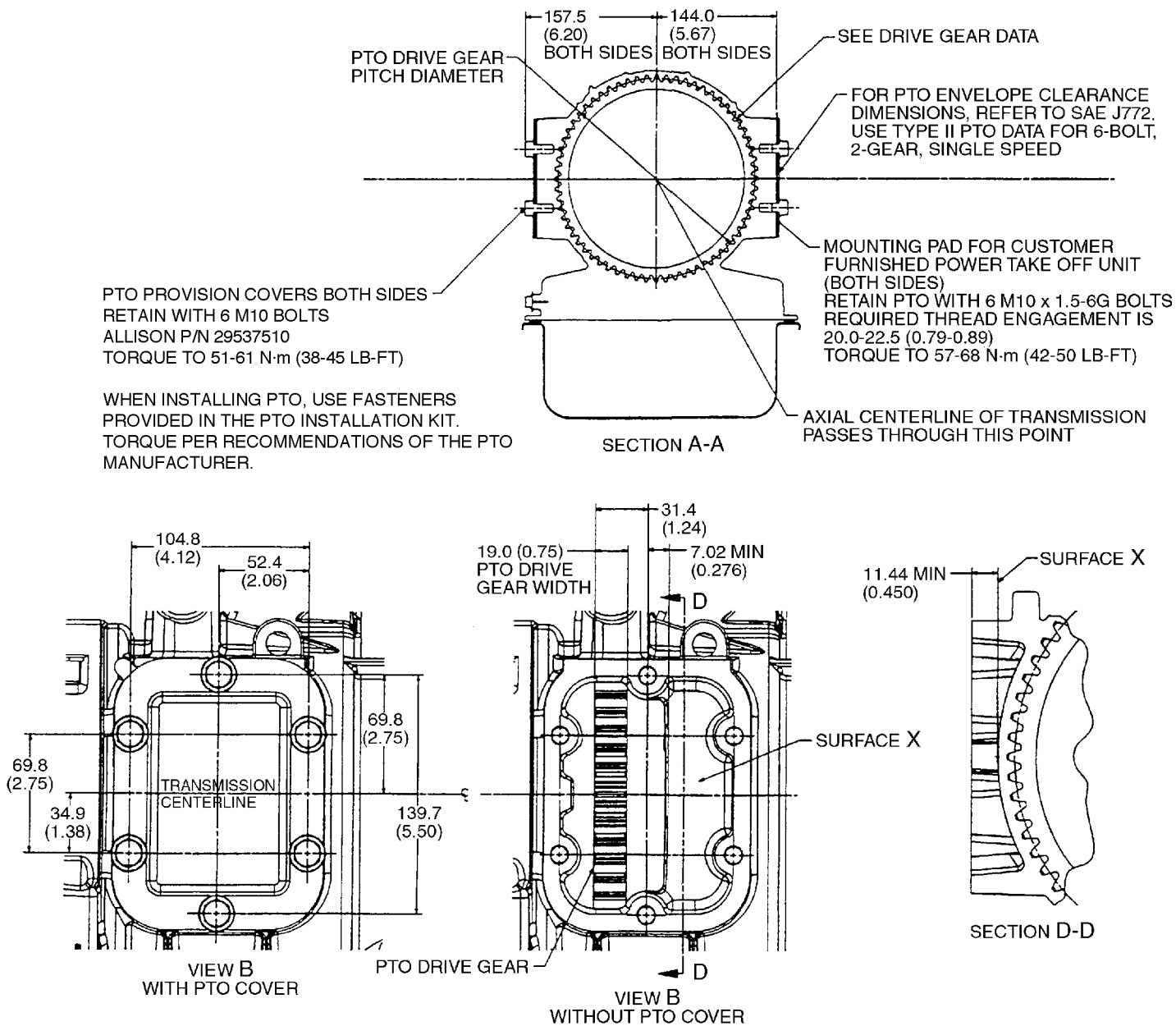
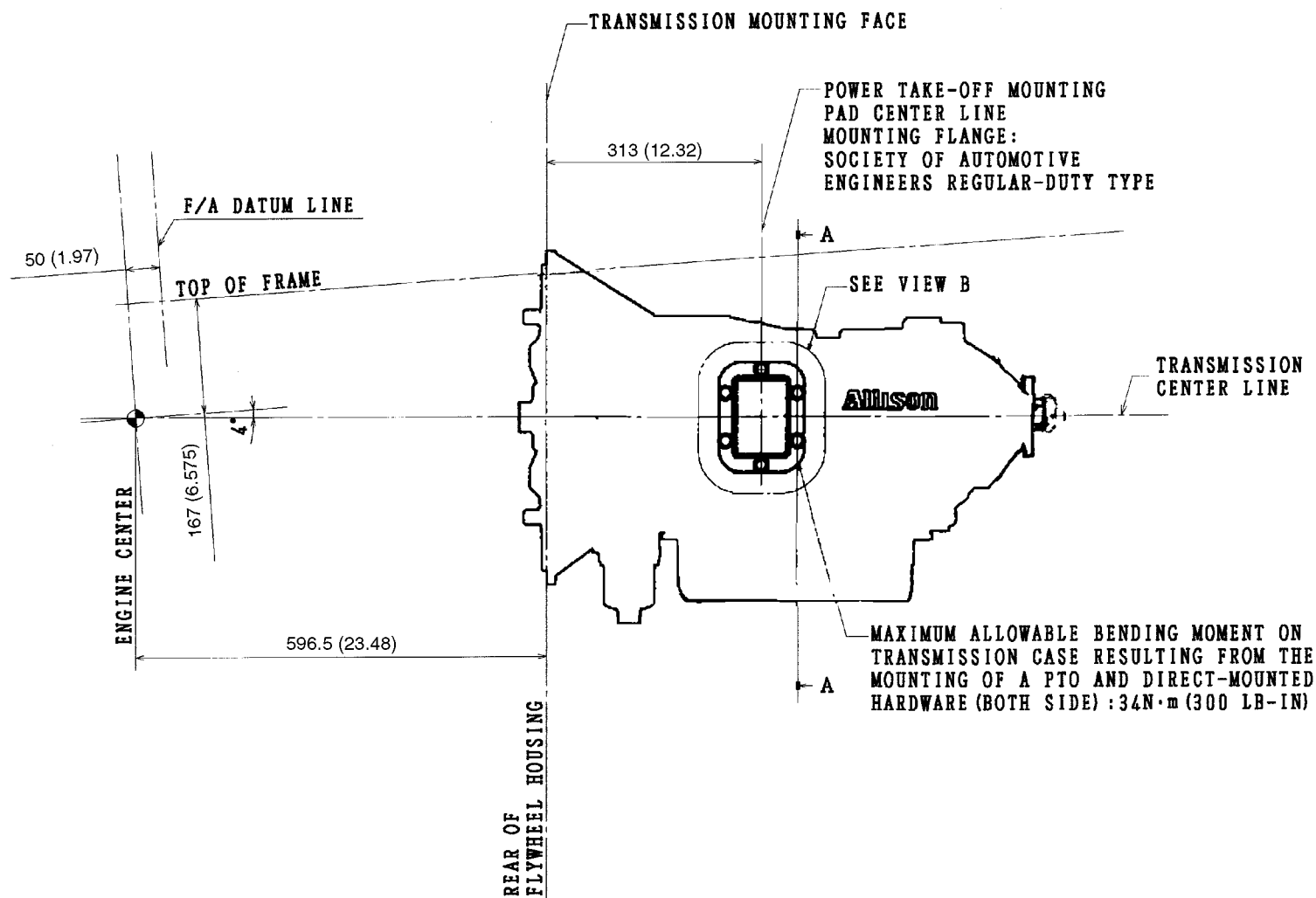
• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
With P.T.O. on One Pad (Continuous)	339 (250)	N·m (pound-foot)
With a P.T.O. on Both Pads Simultaneously – Each, Continuous	271 (200)	N·m (pound-foot)

DRIVE GEAR DATA DIMENSIONS IN INCHES		DRIVE GEAR SPEED	
TEETH 64		NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH P.T.O. LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP)	
PITCH 6.865		2200 SERIES	
PRESSURE ANGLE 20°		1st GEAR	3.10 x OUTPUT SHAFT SPEED
NORMAL MODULE 3.7		2nd GEAR	1.81 x OUTPUT SHAFT SPEED
PITCH DIAMETER 9.32283		3rd GEAR	1.41 x OUTPUT SHAFT SPEED
0.006-0.029 NORMAL OPERATING BACKLASH AFTER P.T.O. IS INSTALLED		4th GEAR	1.00 x OUTPUT SHAFT SPEED
		5th GEAR	0.71 x OUTPUT SHAFT SPEED
		6th GEAR	0.61 x OUTPUT SHAFT SPEED
		REVERSE GEAR	4.49 x OUTPUT SHAFT SPEED

• TRANSMISSION MODEL : ALLISON 2500RDS

Unit : mm (in.)

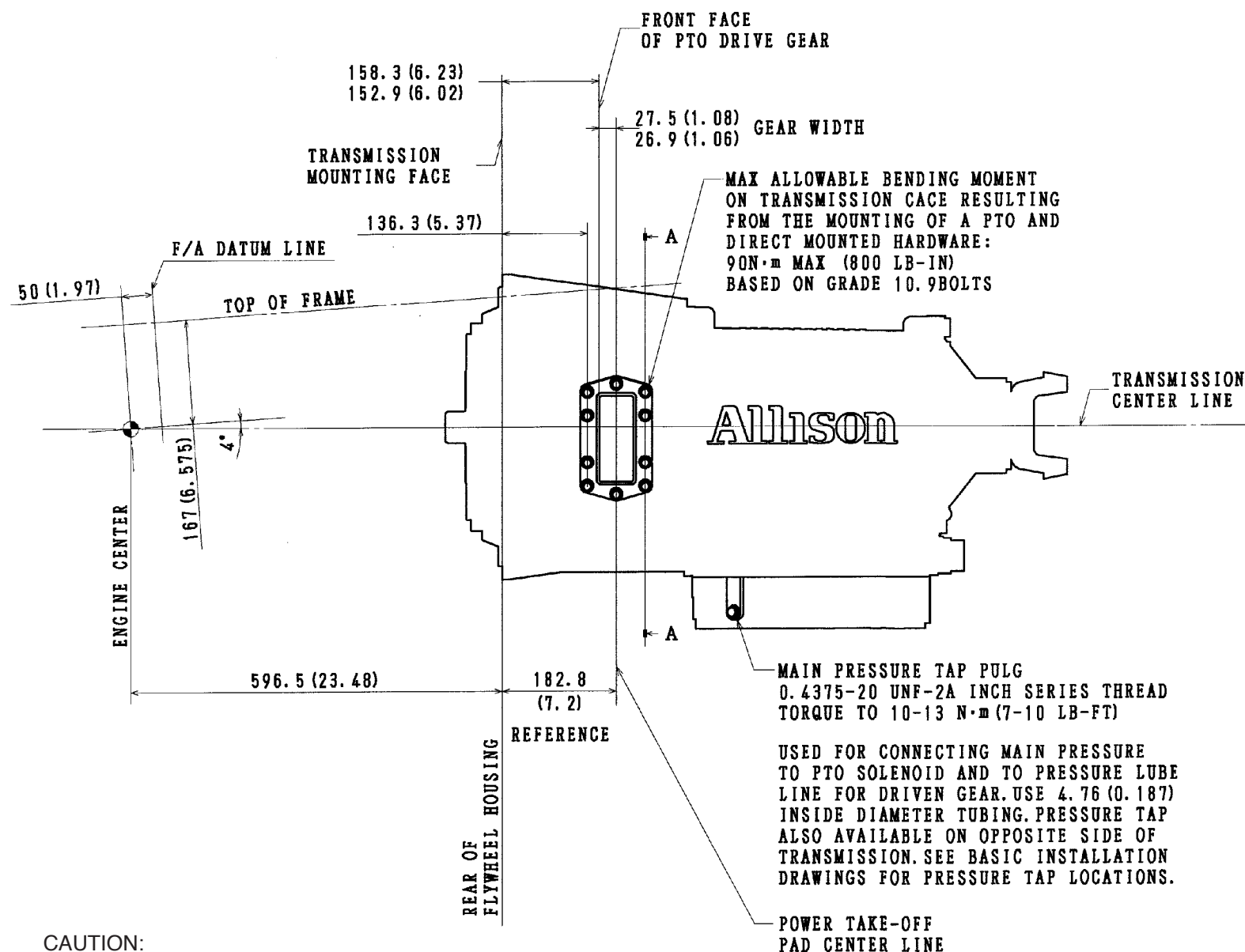


• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
With P.T.O. on One Pad (Continuous)	339 (250)	N·m (pound-foot)
With a P.T.O. on Both Pads Simultaneously – Each, Continuous	271 (200)	N·m (pound-foot)

DRIVE GEAR DATA DIMENSIONS IN INCHES		DRIVE GEAR SPEED	
TEETH 64		NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH P.T.O. LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP)	
PITCH 6.865		2500 SERIES	
PRESSURE ANGLE 20°		1st GEAR	3.51 x OUTPUT SHAFT SPEED
NORMAL MODULE 3.7		2nd GEAR	1.90 x OUTPUT SHAFT SPEED
PITCH DIAMETER 9.32283		3rd GEAR	1.44 x OUTPUT SHAFT SPEED
0.006-0.029 NORMAL OPERATING BACKLASH AFTER P.T.O. IS INSTALLED		4th GEAR	1.00 x OUTPUT SHAFT SPEED
		5th GEAR	0.74 x OUTPUT SHAFT SPEED
		6th GEAR	0.64 x OUTPUT SHAFT SPEED
		REVERSE GEAR	5.09 x OUTPUT SHAFT SPEED

• TRANSMISSION MODEL : ALLISON 3000RDS AND 3500RDS



CAUTION:

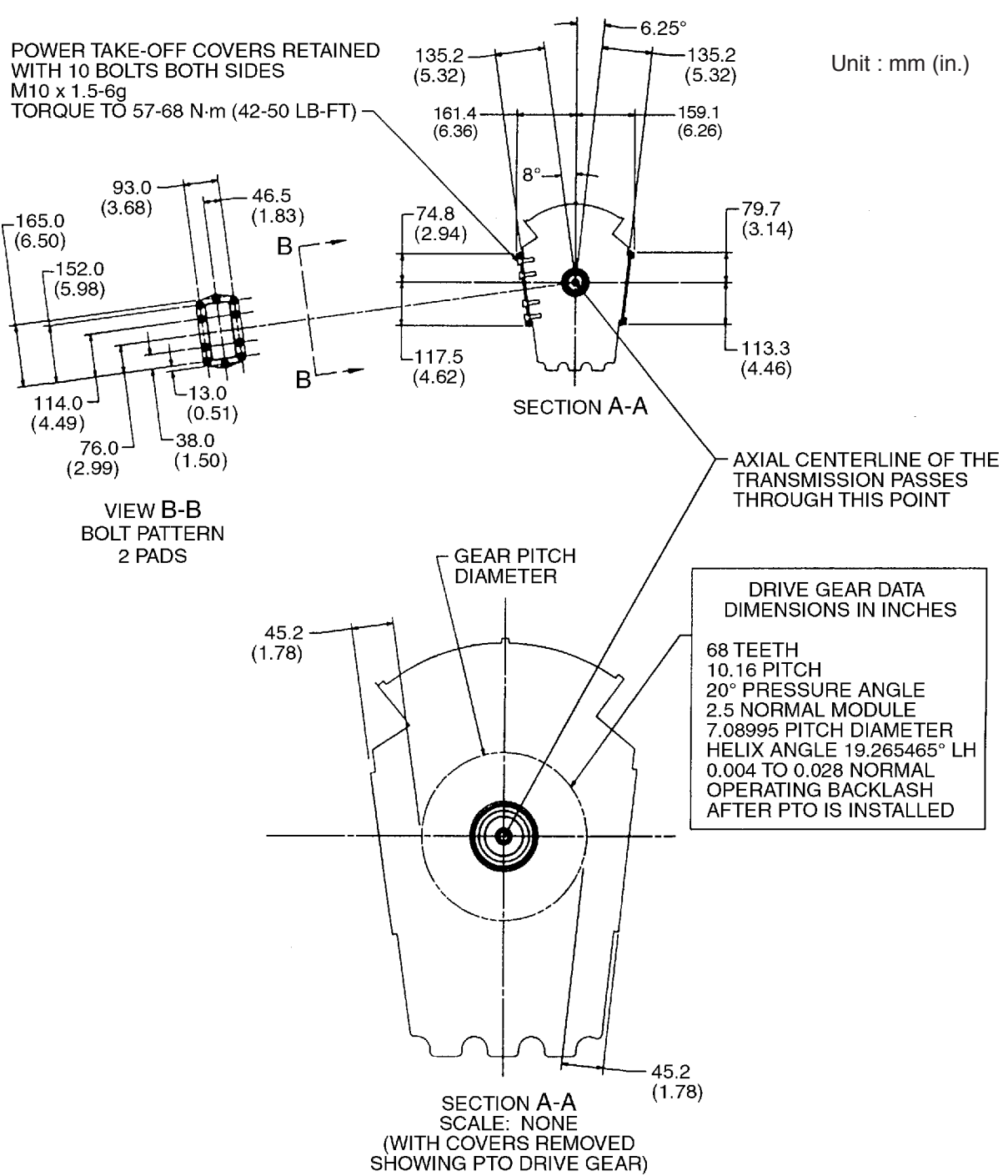
Torques shown for customer-furnished fasteners and threaded components are for plain (non-plated) threads. Torque requirements should be reviewed if plated items will be used. Consult the supplier.

P.T.O. output speed (rpm):

Engine speed x  $\frac{\text{Drive gear}}{\text{Driven gear}} \times \frac{\text{P.T.O. input gear}}{\text{P.T.O. output gear}}$

• POWER TAKE OFF DRIVE GEAR RATINGS

TRANSMISSION CONFIGURATION	VALUE	UNIT
Drive Gear Torque (Continuous Operation)		
With P.T.O. on One Side	660 (485) Max.	N·m (pound-foot)
With P.T.O. on Both Sides	930 (685) Max.	N·m (pound-foot)



## 6. ENGINE REV. CONTROL FOR MOUNTING OF BODY OR EQUIPMENT

### (ENGINE ACCELERATOR PROVIDED HINO GENUINE BY OPTION)

Engines which are mounted to the Hino truck models are controlled by a electric computer. Make sure following procedure how to control of engine revolution (speed) hereinafter collectively referred engine revolution when provide power take off device (ex. Transmission P.T.O.) in order to control mounted body or equipment.

The engine accelerator unit, related parts and extension wire are available from Hino authorized dealer.

Connect the connector of Engine accelerator unit with spare connector which is provided inside of right member near No.3 crossmember at chassis frame.

(Refer to chapter 7 "ELECTRICAL POWER SOURCES" for details of specifications and installed position.)

### Detail of related parts

PART NAME	PART NUMBER
Link Assy., Accelerator	78100-E0040
Lever assy., control	78130-E0010
Harness sub assy., extend	S8207-11470

### Range of control

Idle to Max. revolution. (Can be controlled variable revolution.)

### Condition of operation

- Vehicle speed must be less than 20km/h (32mile/h).
- Transmission must be in neutral position.
- Engine speed must be reduced to idle.
- Engine accelerator unit must be idle position.
- P.T.O. engagement signal must be connected to Engine Control ECU.

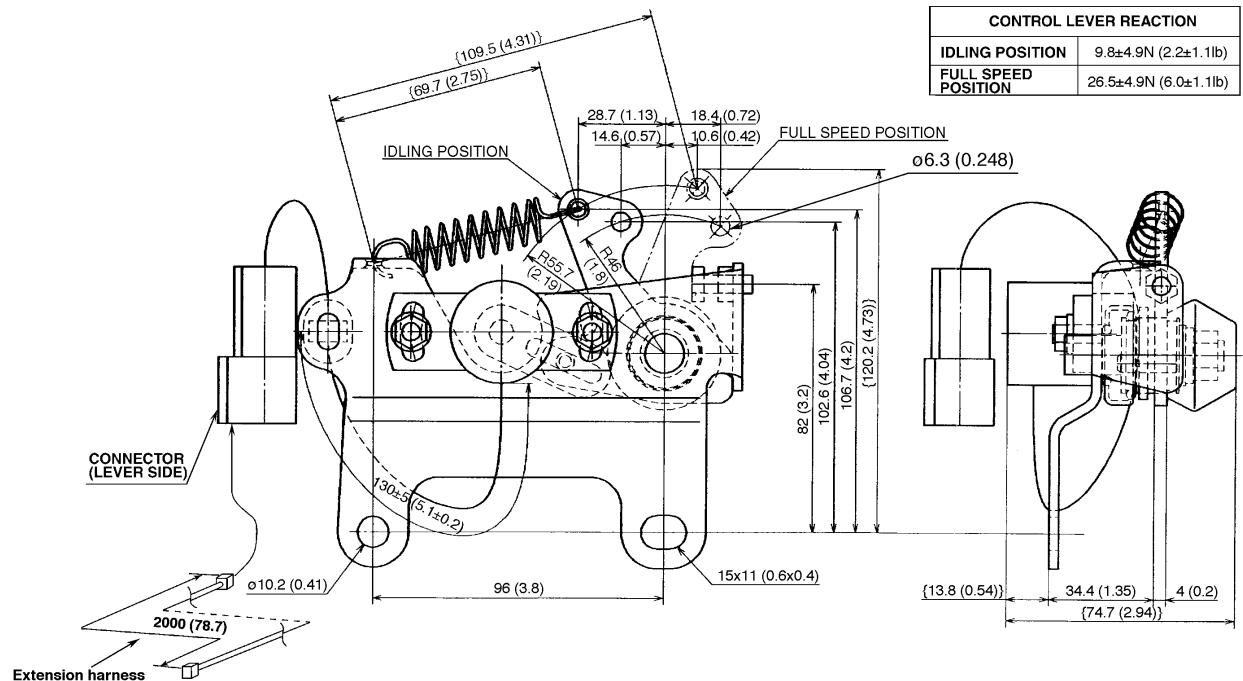
Engine speed will be controlled when the above conditions are met.

If any condition noted in the listed above is not met, engine speed control will normal be operated by accelerator pedal.

## How to install the engine accelerator

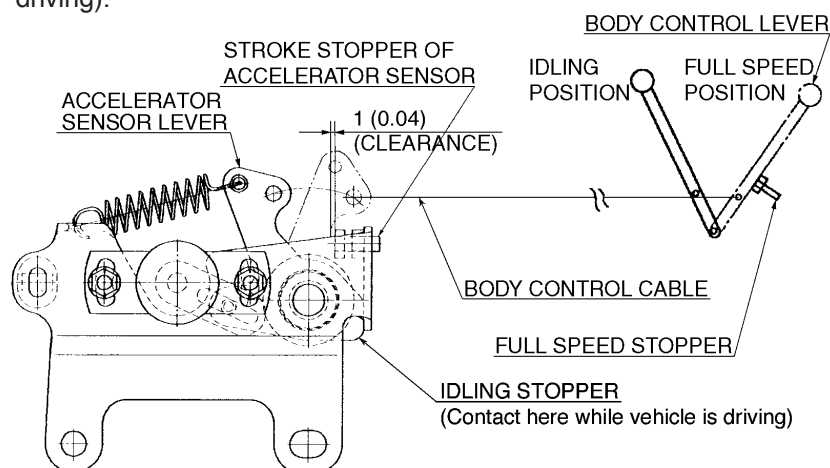
### Outline figure of Engine Accelerator

Unit : mm (in.)



## How to install

- Ensure that the body control lever is equipped with a full speed stopper, in order to control the stroke of the sensor lever.
- Adjust the body control lever so that the full speed stopper makes contact earlier than the stroke stopper of accelerator sensor.
- Ensure that the accelerator sensor lever will be in contact with the idling stopper by adjusting the speed control lever when the P.T.O. or equipment is not operating (during normal driving).



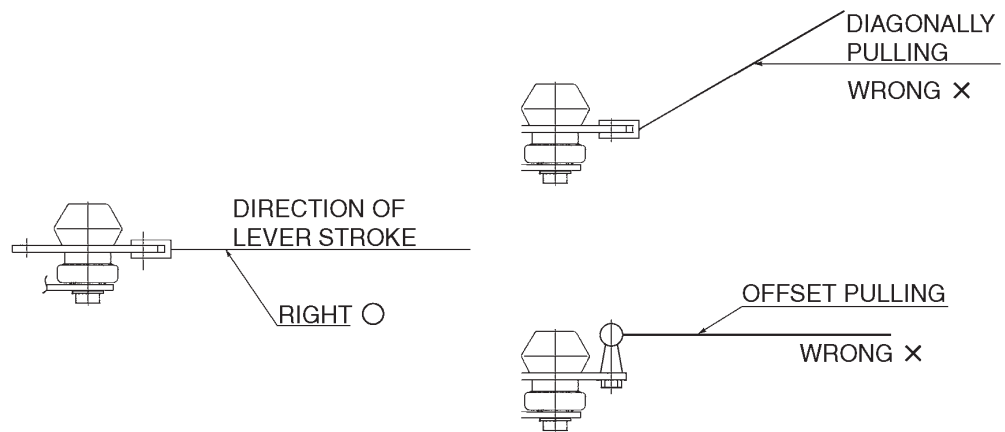
[NOTE]

The clearance specified for the accelerator sensor stroke stopper is for reference only.

If the sensor side stopper comes into contact earlier, stresses will be imposed upon the sensor shaft and may result in damage to the parts.

Also, if the sensor lever does not come into contact with the idling stopper, it may result in improper engine operation during normal driving conditions.

- When installing the cable on the accelerator sensor lever, ensure that the cable pulls in a parallel direction to the lever stroke so that an imbalanced load is not applied to the sensor shaft. See the following figure.



### Cautions when installing the engine accelerator sensor

- Do not attempt to disassemble the sensor.
- Do not drop or otherwise shock the sensor, as this will lead to malfunction.
- Prevent water intrusion or direct splash.
- The sensor operating range is  $-30^{\circ}\text{C}$  to  $80^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$  to  $176^{\circ}\text{F}$ ) and should only be used in that range.
- Avoid mounting the sensor in an area that may receive casual impacts.
- The sensor must be located in an area free of oil, dust, humidity, chemicals and vibration.
- If a well protected location is not available, then a cover must be installed.
- Install the wiring harness so that it is secure and not able to twist or bend.
- Refer to the Chapter 7 for instructions regarding installation of the harness.
- If the sub-harness is not long enough, extending the harness must be completed using the same type of wire.

## 7. SIGNAL FOR ALLISON TRANSMISSION

A connector for P.T.O. control is provided.

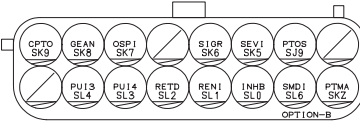
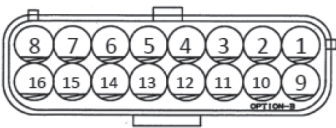
Should connect the connector for P.T.O. information to transmission control ECU when installing P.T.O. to Allison transmission.

For control system data and other technical data related P.T.O. installation, contact to ALLISON Transmission Division (ATD) distributors or dealers.

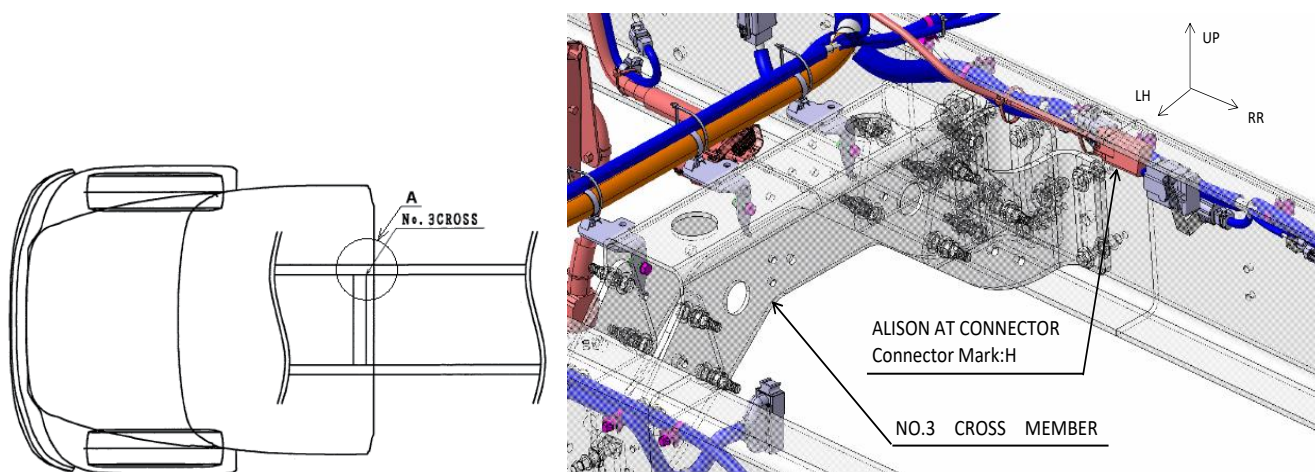
### Detail of Allison Transmission connector as shown in the table

Connector Mark	Pole Code	Circuit	Max Capacity [A]	Wire Size & Color	Connector Part No.	Coupling Connector Part No.	Allison transmission		Description	
							2200/2500	3000	Circuit name	Wire code
H	SK9	P.T.O. DRIVE INPUT	—	0.85 L-B	Delphi PART No.54241631 (HINO PART No.S8281-E0M20)	Delphi PART No.54241601 (HINO PART No.S8281-E0M30)	○	○	P.T.O. DRIVE INTERFACE 1	143
	SK8	RANGE INDICATOR	—	0.85 B-R			○	○	AUTOMATIC NEUTRAL - SINGLE INPUT FOR P.T.O. (OUTPUT)	145
	SK7	OUTPUT SPEED INDICATOR	—	0.85 B-G			○	○	OUTPUT SPEED INDICATOR A	105
	SK6	SIGNAL RETURN	—	0.85 B-Y			○	○		103
	SK5	SECONDARY MODE INDICATOR	—	0.85 G-R			—	○	SECONDARY MODE INDICATOR	113
	SJ9	P.T.O. DRIVE INTERFACE 1 INDICATOR	—	0.85 P-			○	—		150
	SL4	DIRECTION CHANGE ENABLE INPUT	—	0.85 R-G			○	○	DIRECTION CHANGE EABLE INPUT	122
	SL3	NEUTRAL AT STOP	—	0.85 R-L			○	○	NEUTRAL AT STOP INPUT - STANDARD OR PREMIUM ① INTEGRATED WITH BRAKE SYSTEM COMPONENTS ② INTEGRATED WITH PROGRAMMABLE LOGIC CONTROLLER(PLC)	123
	SL2	SUMP TEMPERATURE	—	0.85 V-			○	○	SUMP/RETARDER TEMPERATURE INDICATOR	164
	SL1	AUTO MATIC NEUTRAL	—	0.85 BR-			—	○	AUTOMATIC NEUTRAL - SINGLE INPUT FOR P.T.O. (INPUT)	117
	SL0	RANGE INHIBIT INPUT	—	0.85 L-R			○	○	AUXILIARY FUNCTION RANGE INHIBIT - SINGLE INPUT	101
	SL6	HOLD INPUT	—	0.85 L-			—	○	AUXILIARY HOLD INPUT	142
	SKZ	P.T.O. DRIVE OUTPUT	—	0.85 B-R			—	○	P.T.O. DRIVE INTERFACE 1	130

## Detail of connector

MARK	CONNECTOR	
	VEHICLE SIDE	COMPANION SIDE
H		
	Delphi PART No. 54241631 (HINO PART No.S8281 - E0M20)	Delphi PART No. 54241601 (HINO PART No.S8281 - E0M30)

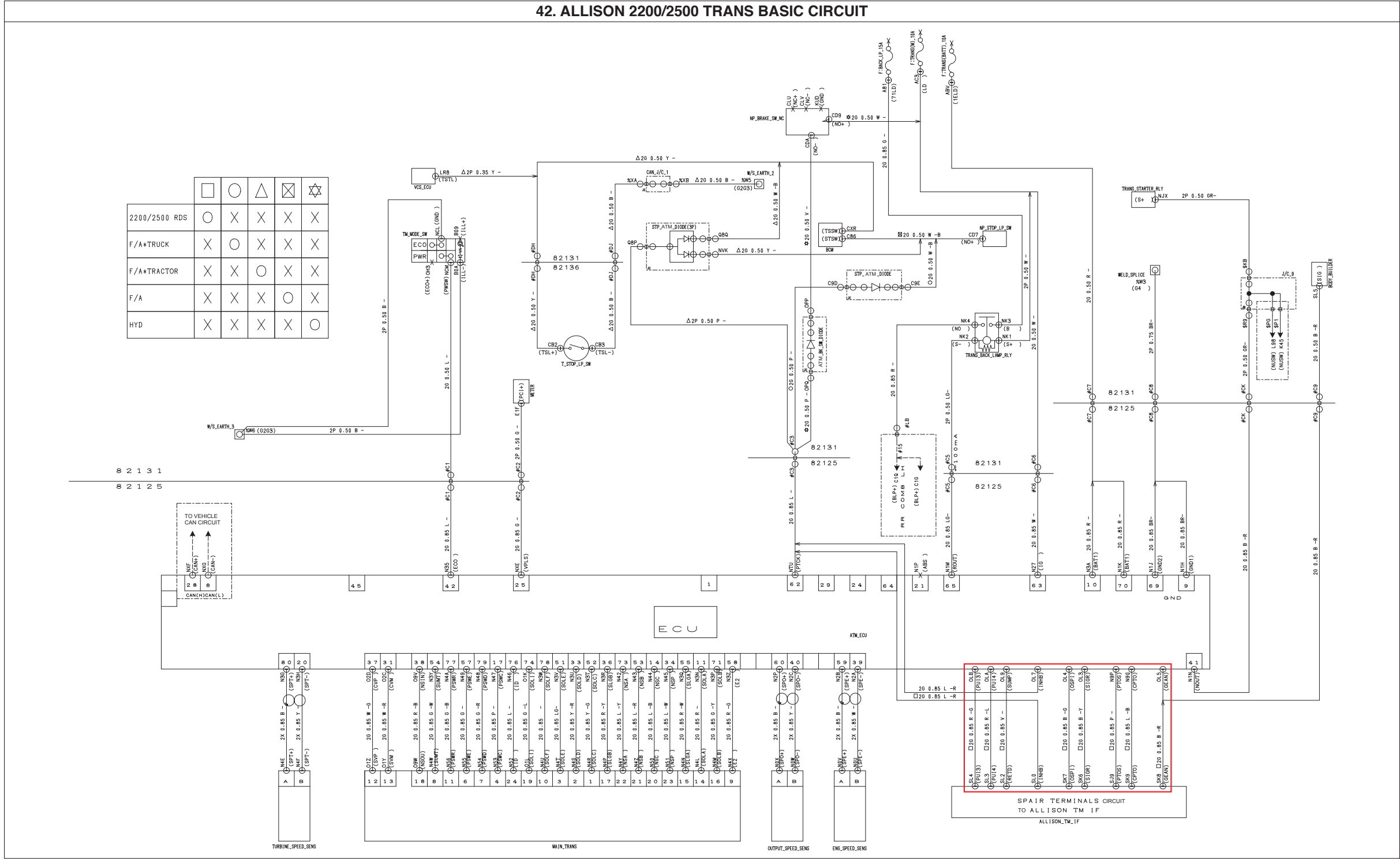
## Installing position of connector



Enlarged A above

DETAIL OF WIRING DIAGRAM

Allison transmission 2200/2500 series



### 43. ALLISON 3000RDS TRANS BASIC CIRCUIT

