Chapter 11

POWER TAKE OFF (P.T.O.)

1. TRANSMISSION P.T.O.
2. TRANSMISSION MODELS TO BE INSTALLED HINO'S VEHICLES
3. OTHER NOTICES
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5. ENGINE REV. CONTROL FOR MOUNTING OF BODY OR EQUIPMENT
6. PTO SIGNAL FOR ALLISON TRANSMISSION

1. TRANSMISSION P.T.O.

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 transmisison, contact to ALLISON Transmission Division (ATD) distributers or dealers.

2. TRANSMISSION MODELS TO BE INSTALLED HINO'S VEHICLES

MODEL			NE8J	NJ8J	NF8J	NV8J	NH8J
TRANSMISSION	MANUAL		Eaton Fuller FS-5406A (6-speed) (J08E-WU)	Eaton Fuller FS-5406A (6-speed) (J08E-WU)	Eaton Fuller FS-6406A (6-speed)	Eaton Fuller FS-6406A (6-speed)	Eaton Fuller FS-6406A (6-speed)
	AUTO	STD	Allison 2200HS (J08E-WU) Allison 2500RDS (J08E-VB)	Allison 2200HS (J08E-WU) Allison 2500RDS (J08E-VB)	Allison 2500RDS	Allison 3000RDS	Allison 3000RDS
		OPT	Allison 2200RDS Allison 2200HS (J08E-VB) Allison 2500RDS (J08E-WU)	Allison 2200RDS Allison 2200HS (J08E-VB) Allison 2500RDS (J08E-WU)	–	Allison 2500RDS Allison 3500RDS	Allison 3500RDS

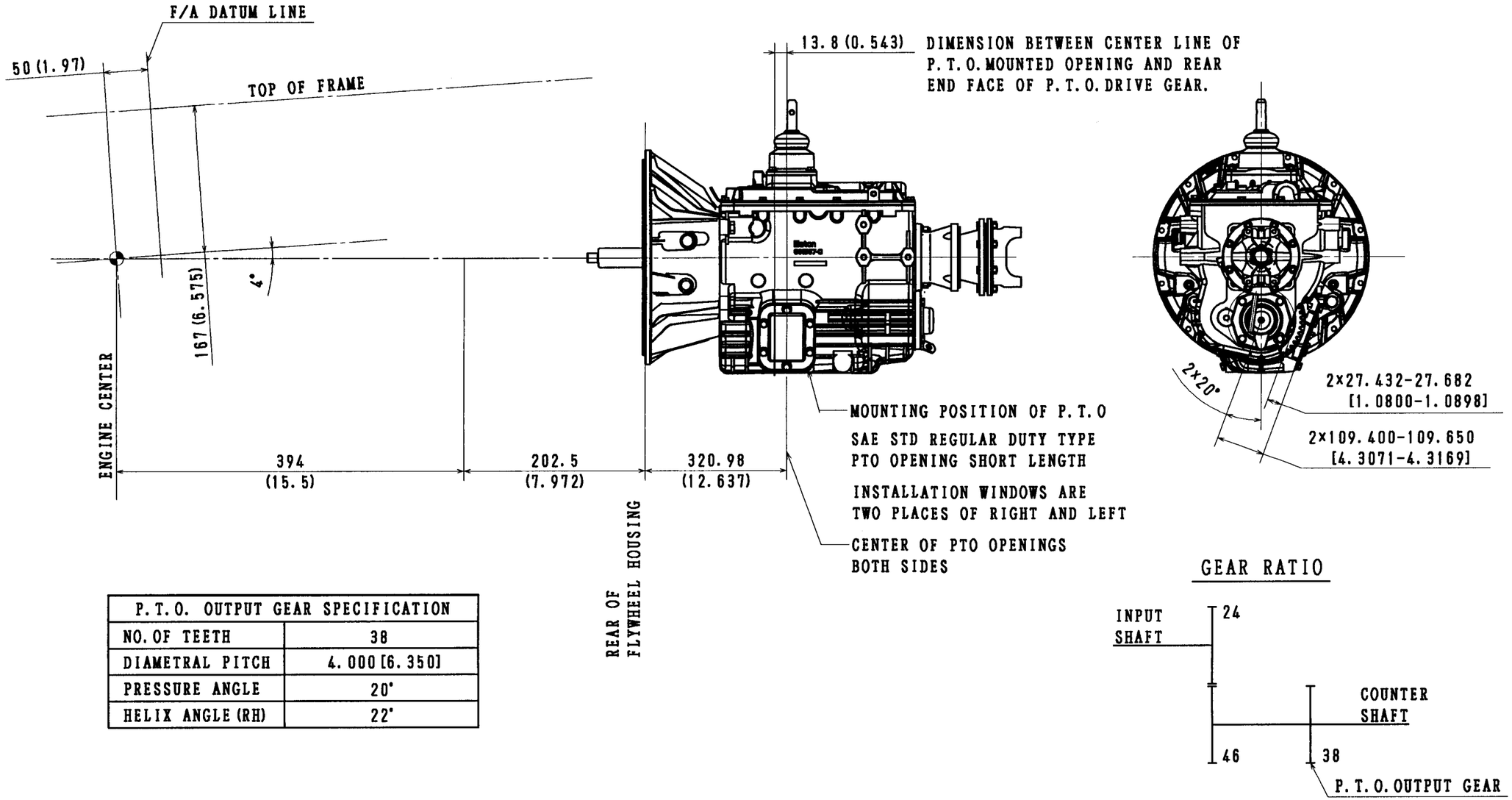
3. OTHER NOTICES

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

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

- **TRANSMISSION MODEL : EATON FULLER FS-5406A**
- **CHASSIS MODEL : NE8J (J08E-WU) AND NJ8J (J08E-WU)**

Unit : mm (in.)

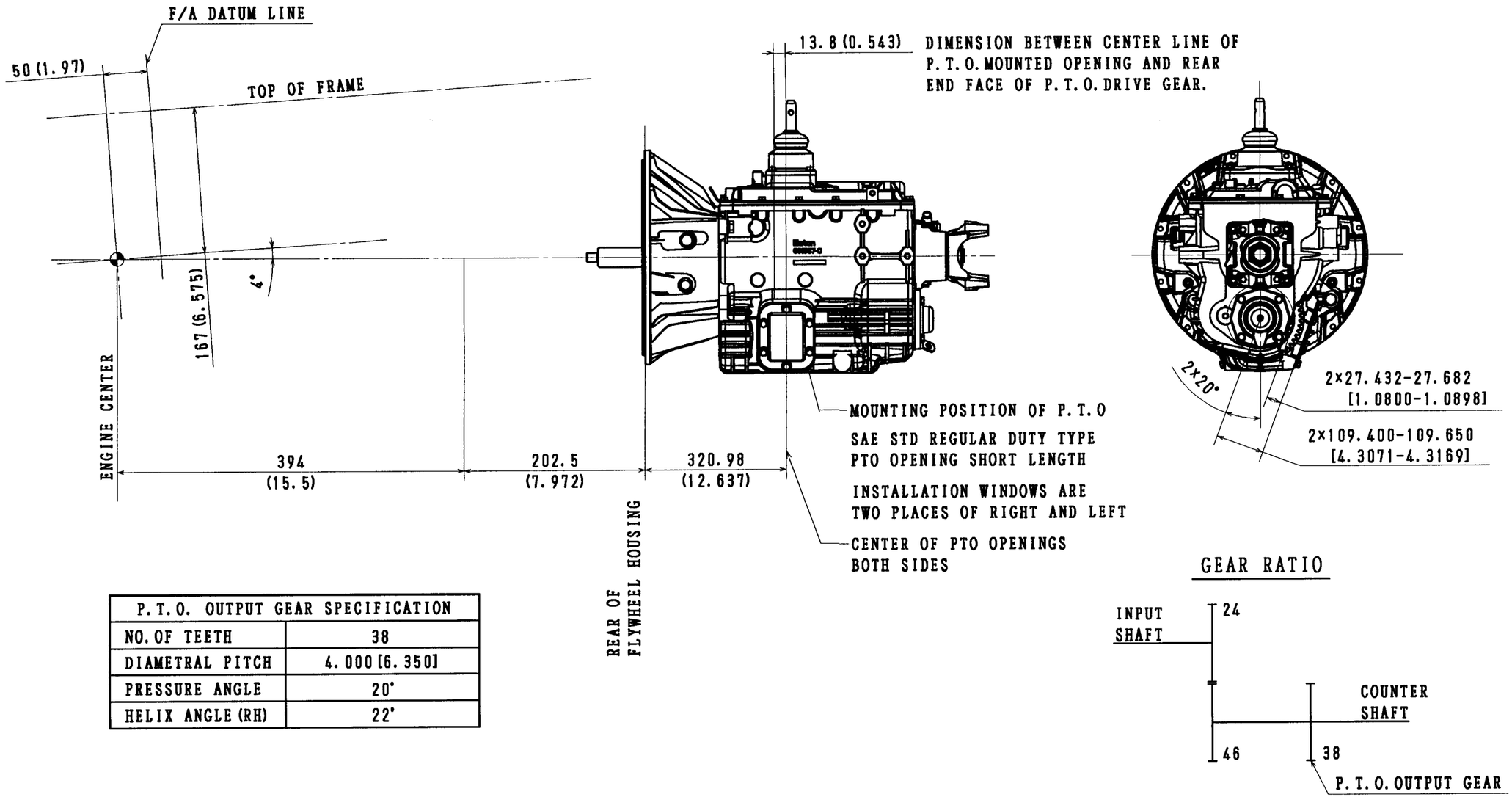


P.T.O. OUTPUT GEAR SPECIFICATION	
NO. OF TEETH	38
DIAMETRAL PITCH	4.000 [6.350]
PRESSURE ANGLE	20°
HELIX ANGLE (RH)	22°

GEAR RATIO

- **TRANSMISSION MODEL : EATON FULLER FS-6406A**
- **CHASSIS MODEL : NF8J, NV8J AND NH8J**

Unit : mm (in.)

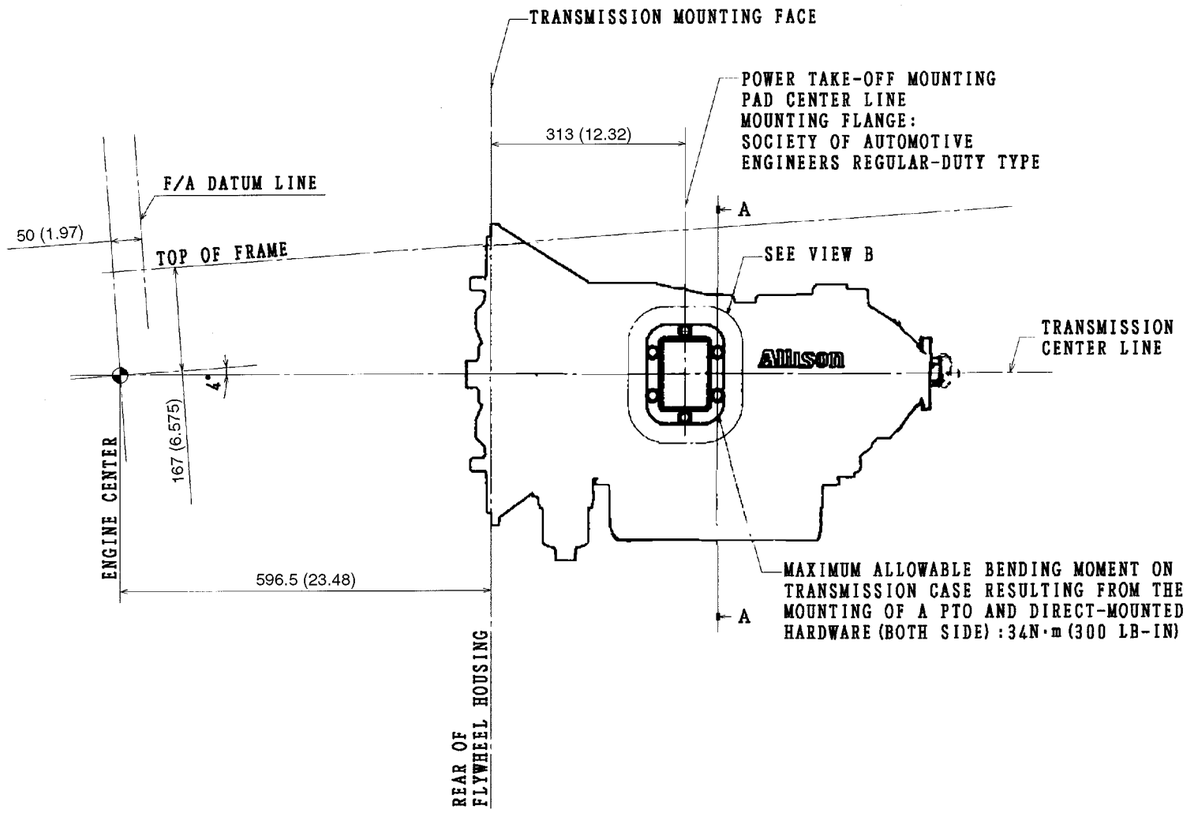


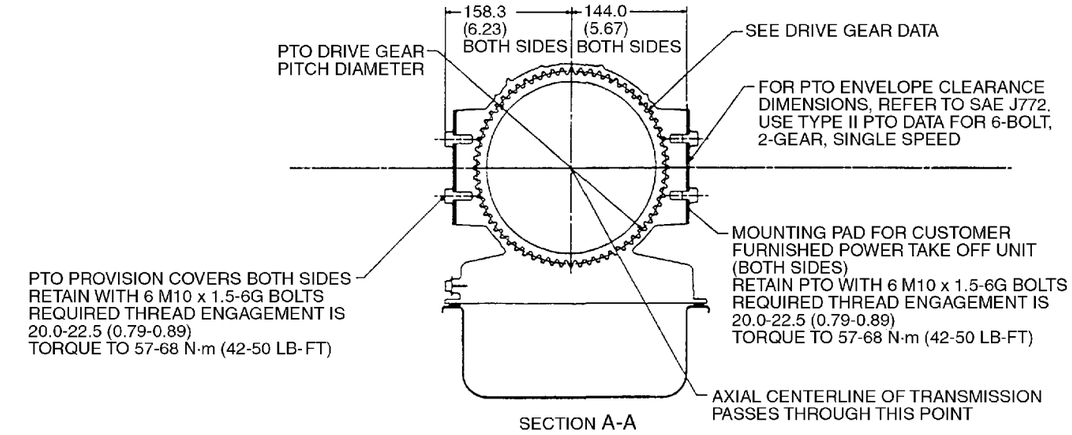
P.T.O. OUTPUT GEAR SPECIFICATION	
NO. OF TEETH	38
DIAMETRAL PITCH	4.000 [6.350]
PRESSURE ANGLE	20°
HELIX ANGLE (RH)	22°

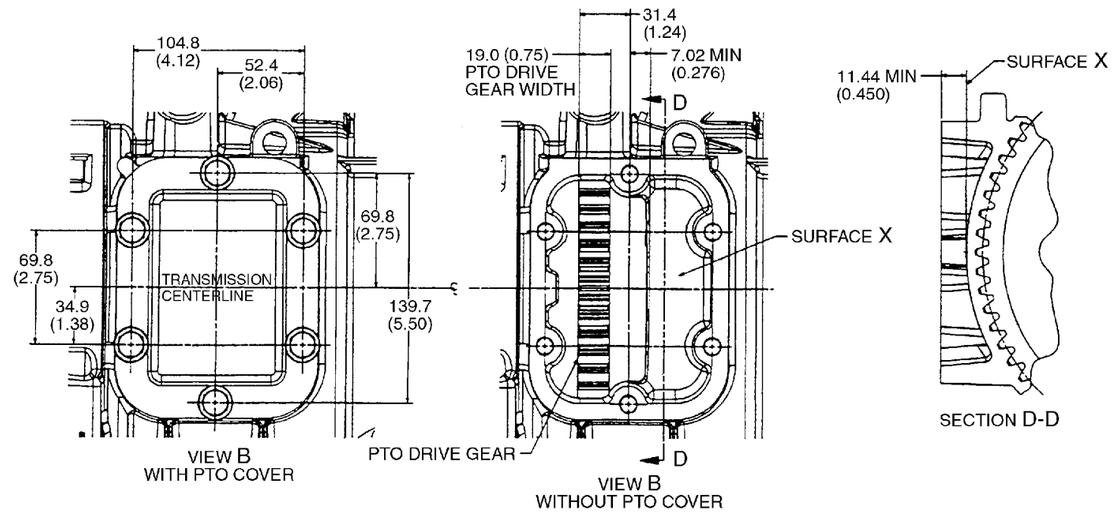
GEAR RATIO

- **TRANSMISSION MODEL : ALLISON 2200 SERIES**
- **CHASSIS MODEL : NE8J (STD:J08E-WU) AND NE8J (OPT:J08E-VB), NJ8J (STD:J08E-WU) AND NJ8J (OPT:J08E-VB)**

Unit : mm (in.)







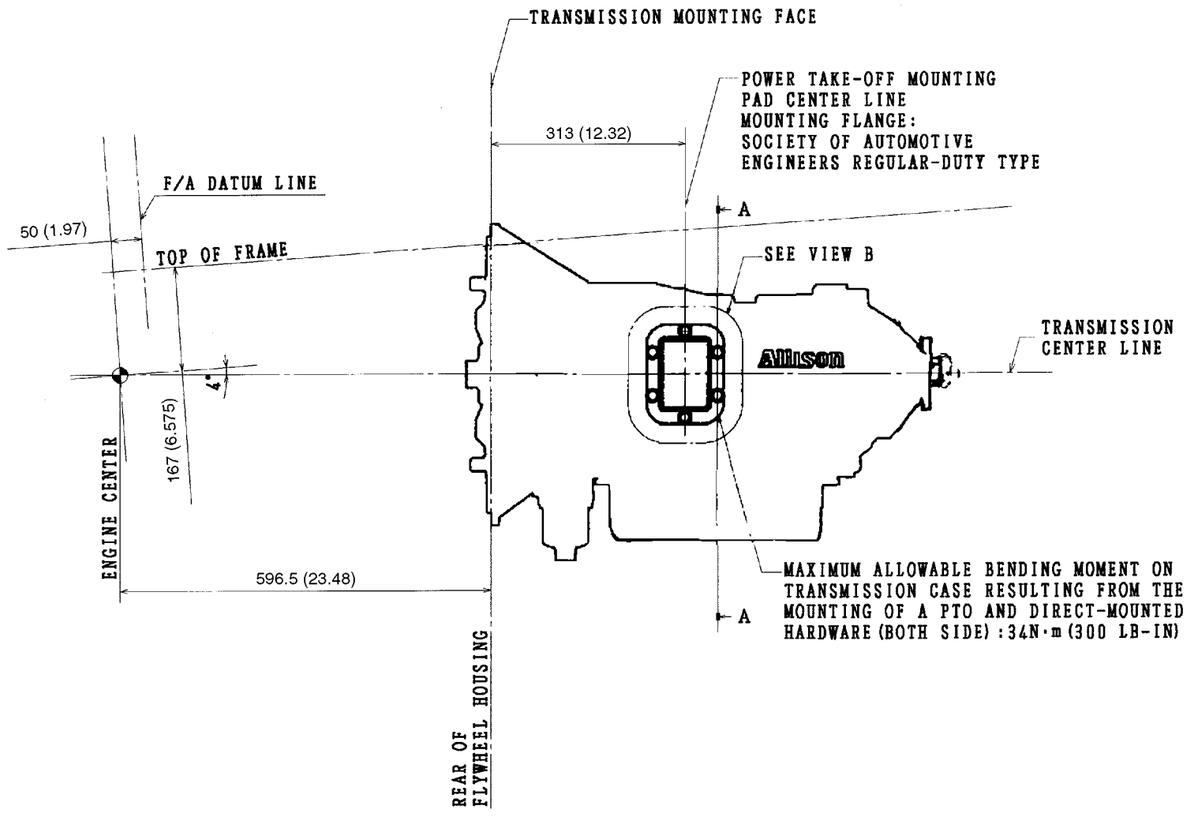
- **POWER TAKE OFF DRIVE GEAR RATINGS**

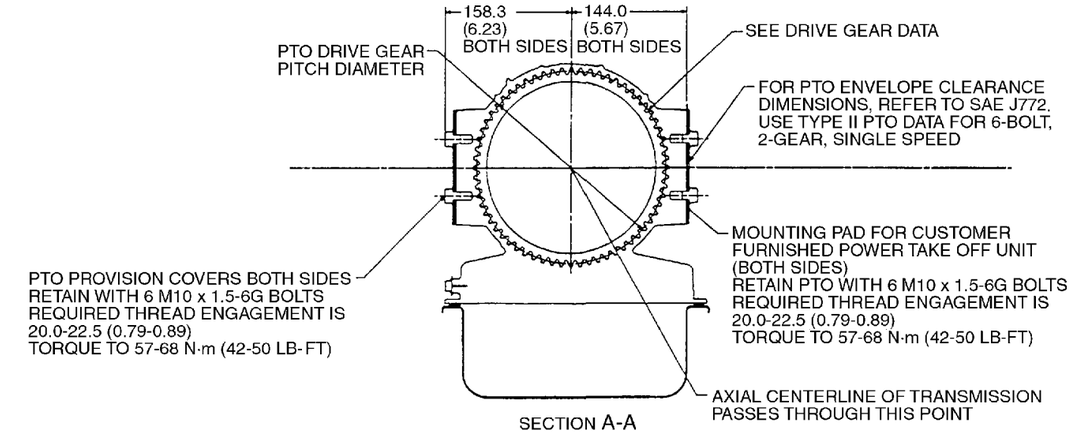
TRANSMISSION CONFIGURATION	VALUE	UNIT
With PTO on One Pad (Continuous)	339 (250)	N·m (pound-foot)
With a PTO on Both Pads Simultaneously – Each, Continuous	271 (200)	N·m (pound-foot)

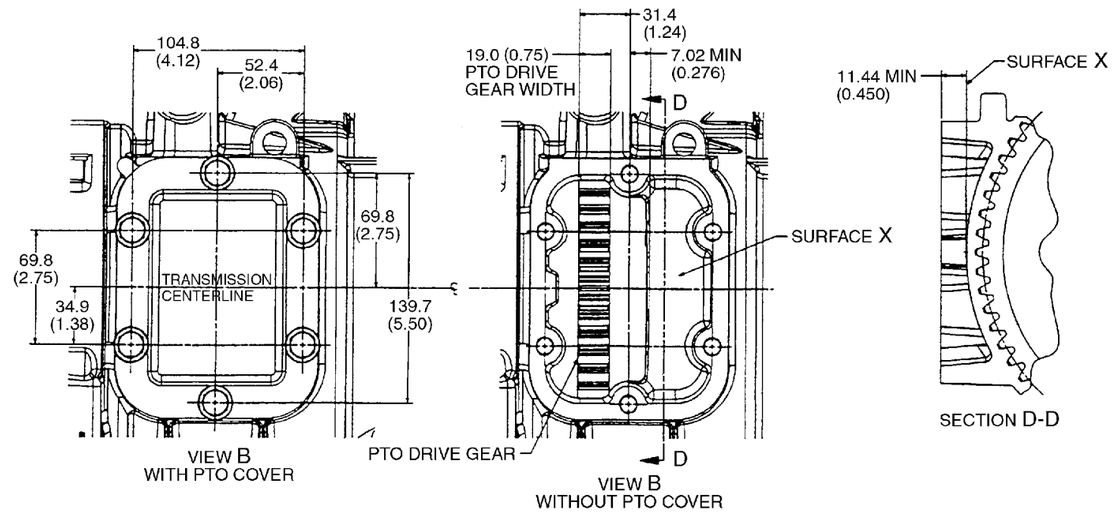
DRIVE GEAR DATA DIMENSIONS IN INCHES		DRIVE GEAR SPEED NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH PTO LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP) 2200 SERIES		
TEETH	64	1st	GEAR	3.10 x OUTPUT SHAFT SPEED
PITCH	6.865	2nd	GEAR	1.81 x OUTPUT SHAFT SPEED
PRESSURE ANGLE	20°	3rd	GEAR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

- **TRANSMISSION MODEL : ALLISON 2500RDS**
- **CHASSIS MODEL : NE8J (STD:J08E-VB) AND NE8J (OPT:J08E-WU), NJ8J (STD:J08E-VB) AND NJ8J (OPT:J08E-WU) AND NV8J (OPT)**

Unit : mm (in.)







- **POWER TAKE OFF DRIVE GEAR RATINGS**

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

DRIVE GEAR DATA DIMENSIONS IN INCHES	
TEETH	64
PITCH	6.865
PRESSURE ANGLE	20°
NORMAL MODULE	3.7
PITCH DIAMETER	9.32283

0.006-0.029 NORMAL OPERATING BACKLASH AFTER PTO IS INSTALLED

DRIVE GEAR SPEED

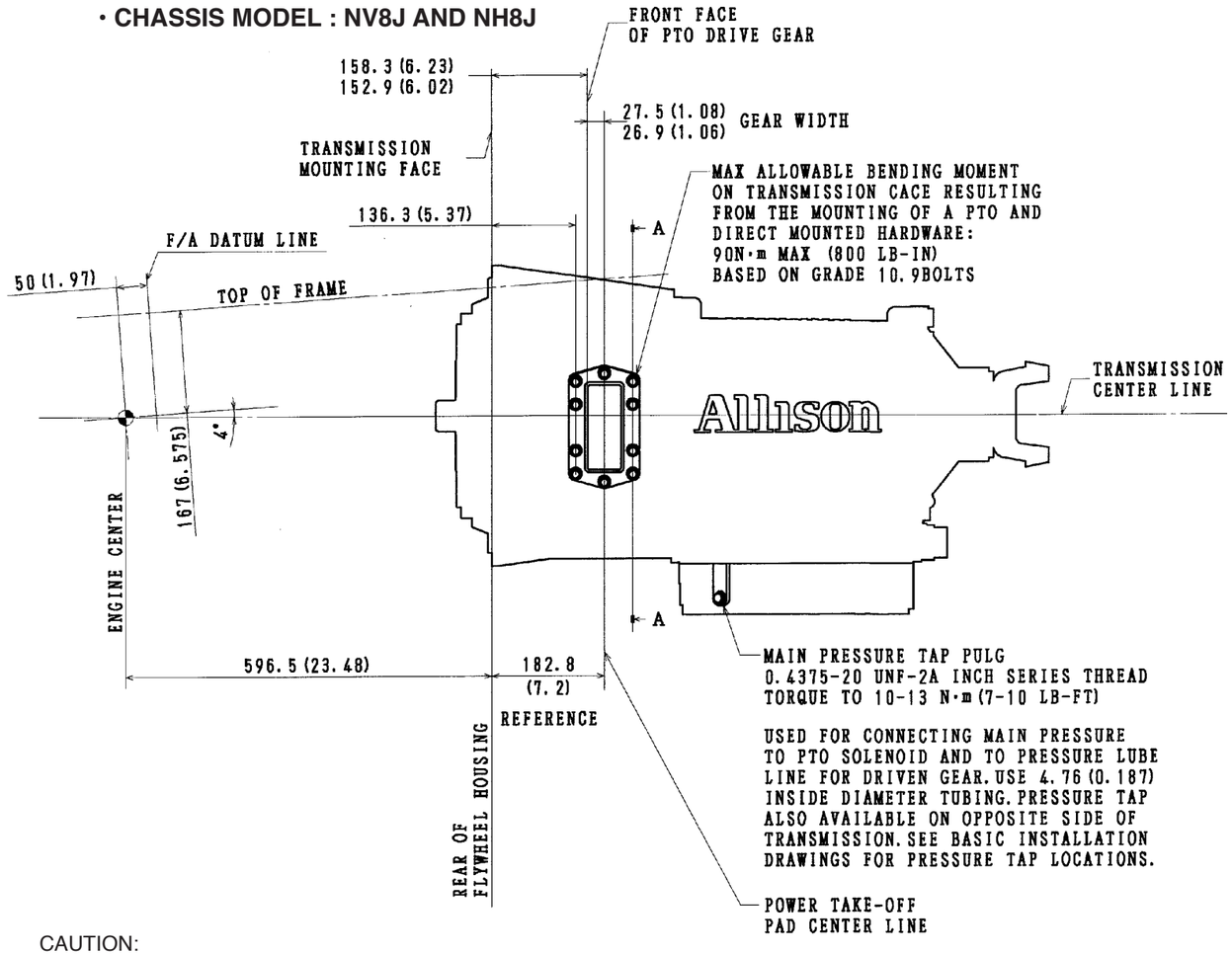
NEUTRAL = TURBINE SHAFT SPEED (SPEED VARIES WITH PTO LOAD. SEE INSTALLATION MANUAL FOR COMPLETE SPEED RELATIONSHIP)

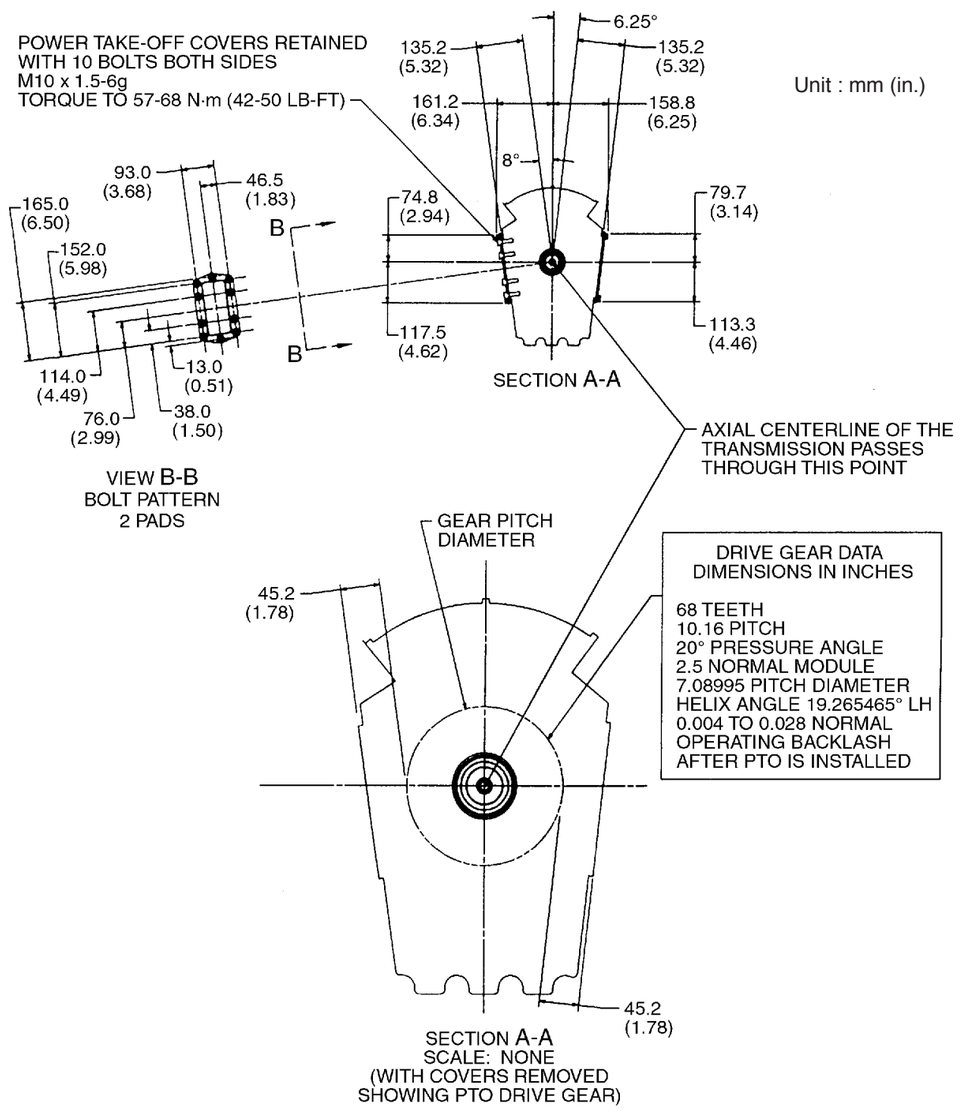
2500 SERIES

1st	GEAR	3.51 x OUTPUT SHAFT SPEED
2nd	GEAR	1.90 x OUTPUT SHAFT SPEED
3rd	GEAR	1.44 x OUTPUT SHAFT SPEED
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

• CHASSIS MODEL : NV8J AND NH8J





CAUTION:

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

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

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

• POWER TAKE OFF DRIVE GEAR RATINGS

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

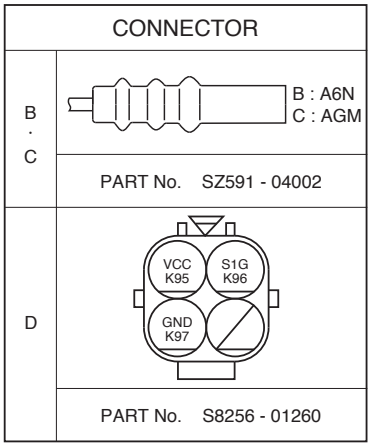
5. ENGINE REV. CONTROL FOR MOUNTING OF BODY OR EQUIPMENT

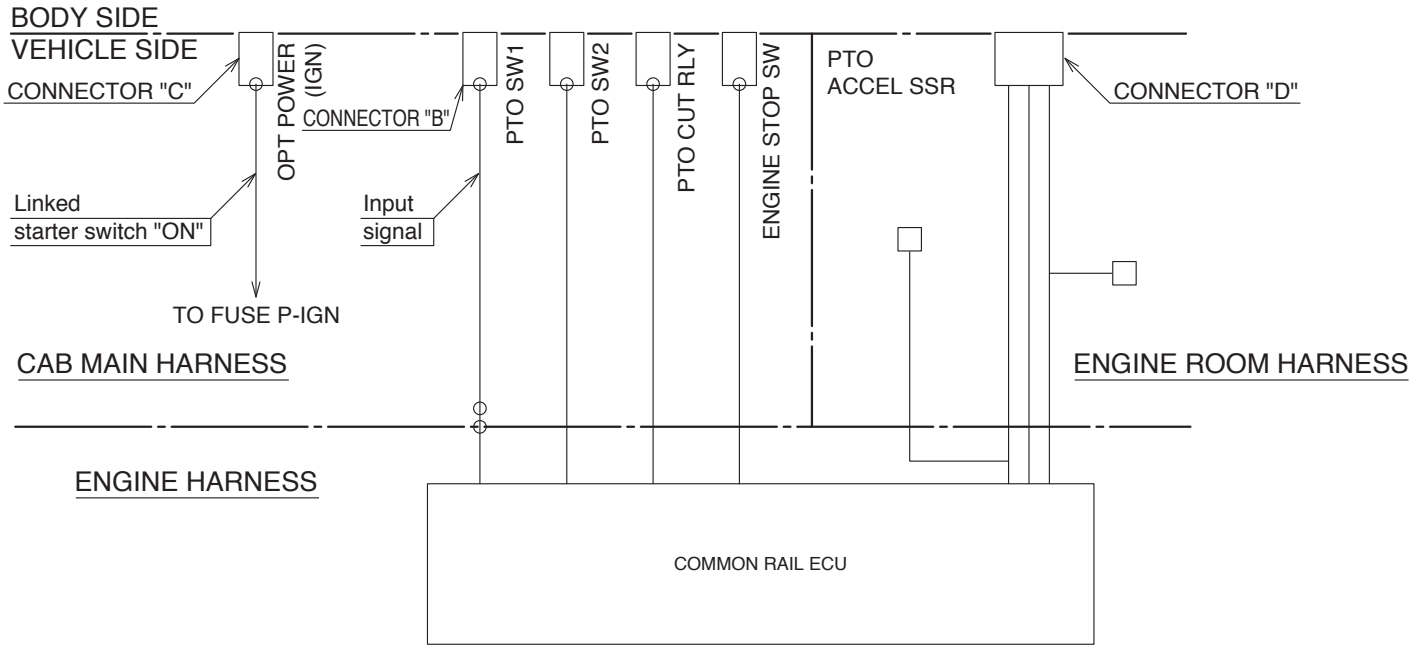
Engines which are mounted to the Hino truck models are controlled by a electric computer. Make sure following procedure how to control of engine revolution (speed) hereinafter collectively referred engine revolution when provide power take off device (ex. Transmission P.T.O.) in order to control mounted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

ELECTRIC CIRCUIT DIAGRAM RELATED WITH ENGINE REVOLUTION CONTROL WHICH IS ORIGINALLY PROVIDED IS FOLLOWING FIGURE.

WARNING

- **Whatever P.T.O. control system is mechanical or pneumatic or electric, the signal circuit of P.T.O. switched on is always connected with engine control computer.**
- **This alteration including provision of P.T.O. unit etc. must be provided own responsibility of Body or Equipment Manufacturer.**
- **Standard function of Engine Acceleration Control by accelerator pedal inside of cabin is cancelled during operation of body or equipment by this system.**





[Note] • Refer to “COMMON RAIL CIRCUIT” and “CONNECTORS” in Chapter 12.
• Connector B and C are provided under the center cluster, instrument panel in cab.
• Connector D is provided in the right frame.
(See chapter 7 “ELECTRICAL POWER SOURCES” for detailed psition.)

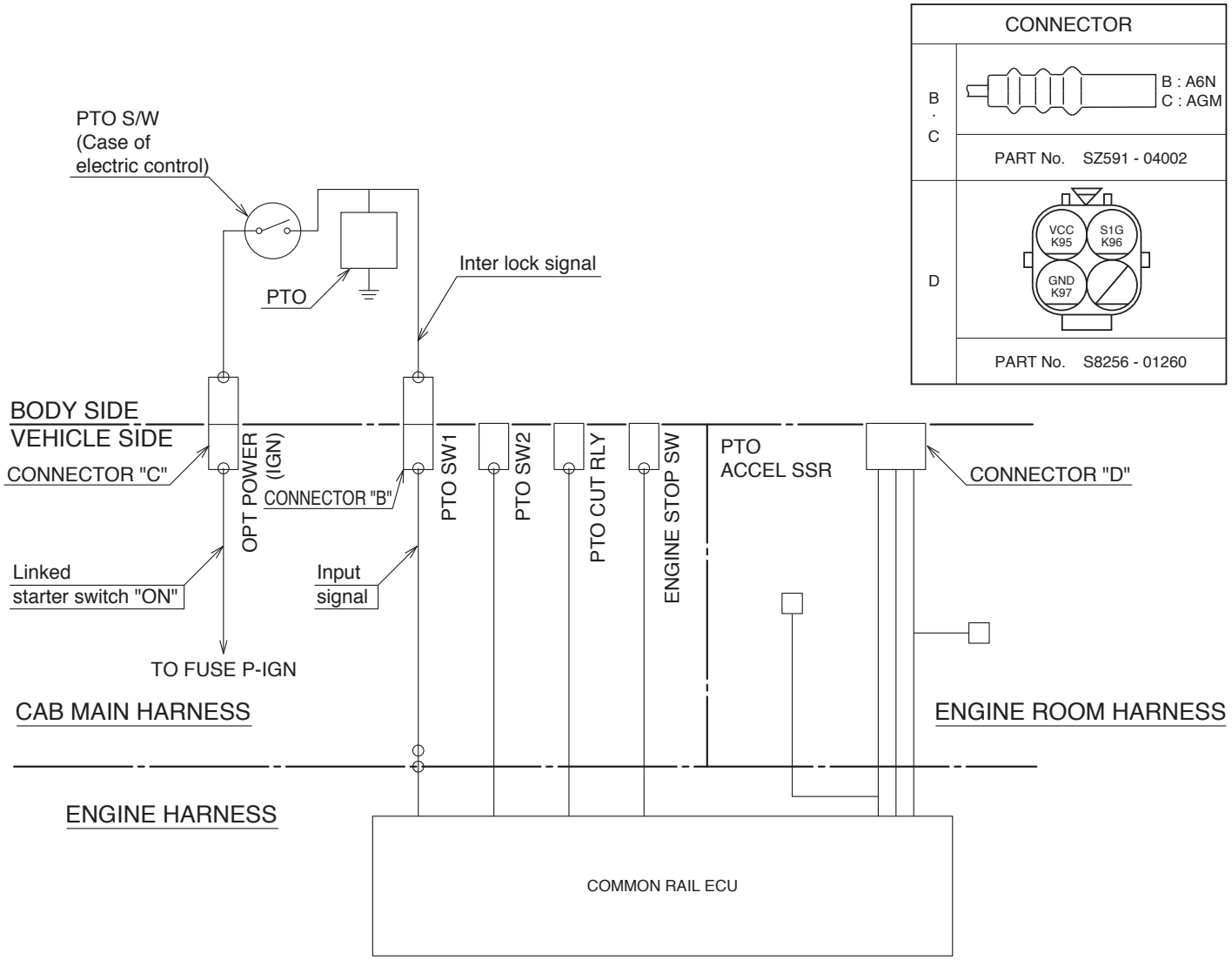
PROCEDURE TO PROVIDE ENGINE REVOLUTION CONTROL DEVICE

EXAMPLE A
(In the case, engine idle-up at the same time with P.T.O. switched on.)

Condition to be adapted this engine idle-up method as follows.
- Required torque of P.T.O. : MAX 147 N·m (108 lb·ft).
- Control range of engine revolution : Idle to MAX 1800 rpm.

Make sure to wire the electric circuit as follwowing figure.

When set up engine revolution, please consult with HMC.
The detail of customization is described in HINO-DXII.



EXAMPLE B
(In the case, the P.T.O. received heavy torque load or required constant engine revolution.)

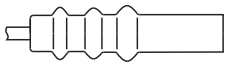
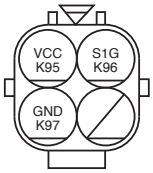
Condition to be adapted this engine idle-up method as follows.
- Required torque of P.T.O. : OVER 147 N·m (108 lb·ft) to MAX. (to be limited by transmission and P.T.O. manufacture.)
- Control range of engine revolution : Idle to MAX.

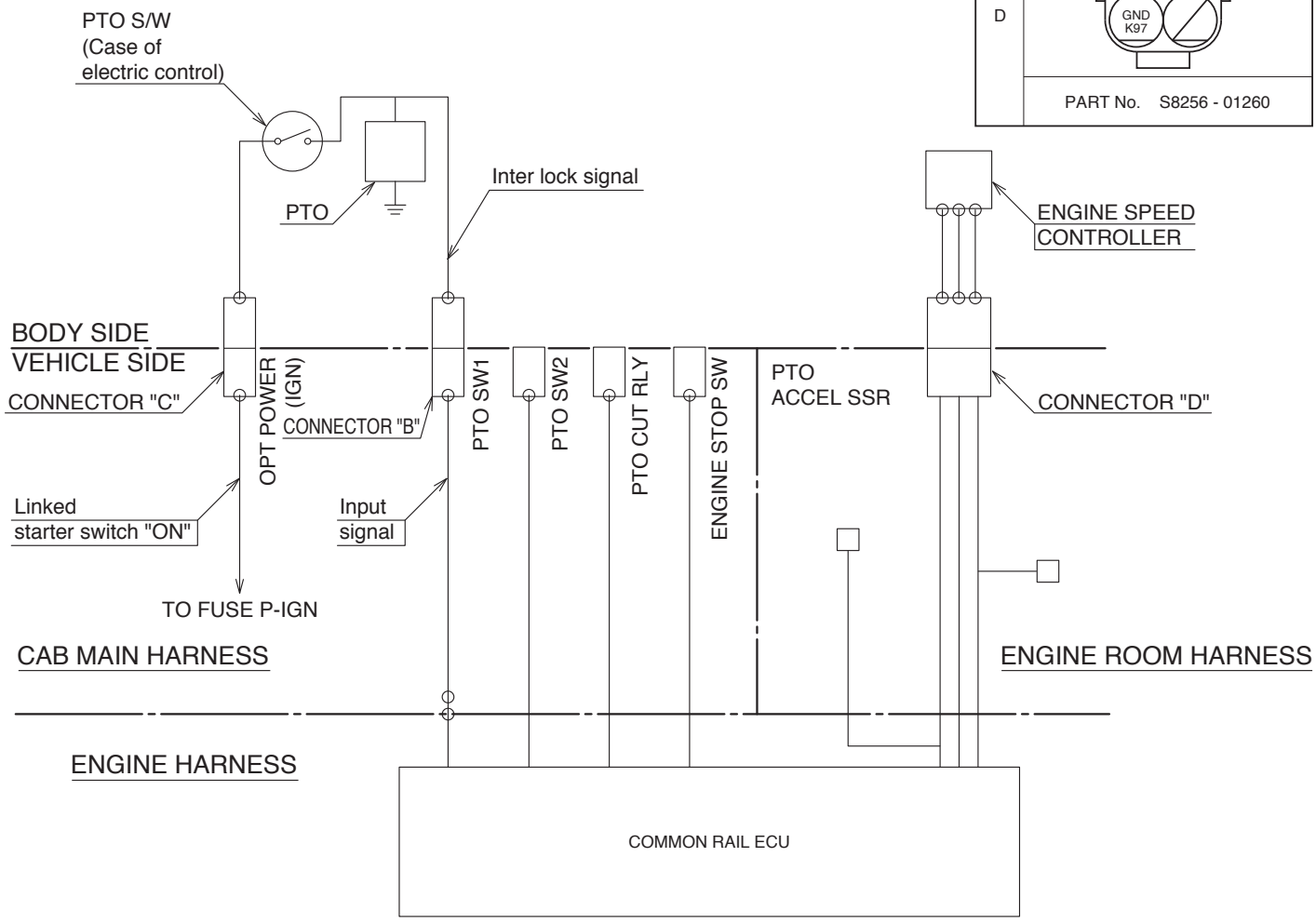
Engine revolution is controlled by the ENGINE SPEED CONTROLLER.

The electrical specification of the ENGINE SPEED CONTROLLER is described in next page.

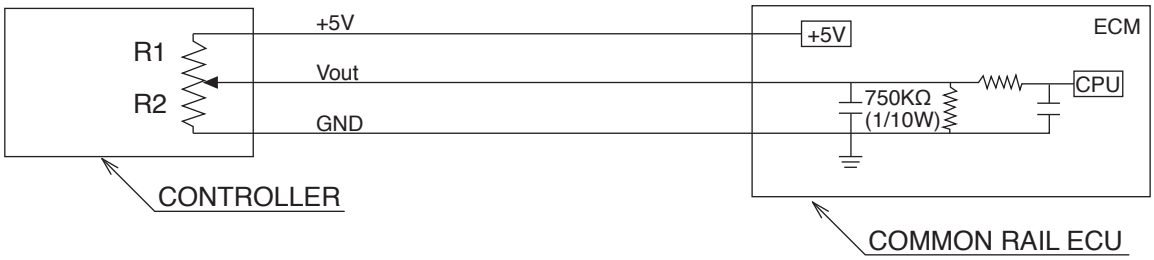
Make sure to wire the electric circuit as follwowing figure.

When set up engine revolution, please consult with HMC.
The detail of customization is described in HINO-DXII.

CONNECTOR	
B · C	 B : A6N C : AGM
	PART No. SZ591 - 04002
D	
	PART No. S8256 - 01260



SPECIFICATION OF THE ENGINE SPEED CONTROLLER



calculation ;

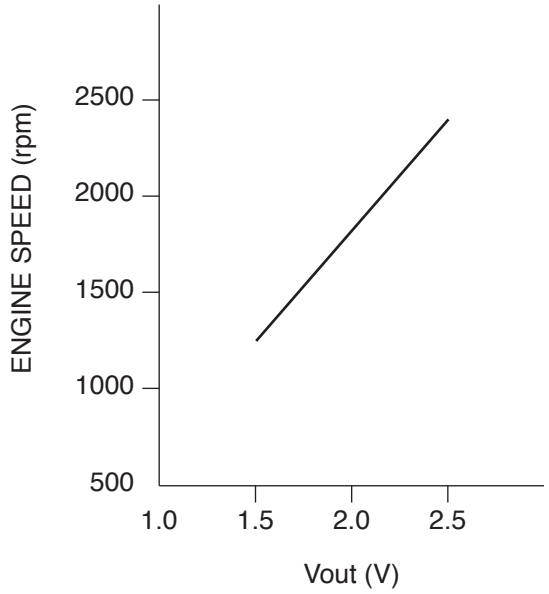
Vout = 5xR/(R1+R)

1/R = (1/R2)+(1/750)

Note ; R1+R2 = 2kΩ

R1 (Ω)	R2 (Ω)	Vout (V)	ENGINE SPEED (rpm)
1500	500	1.25	The same voltage will not produce the same ENGINE SPEED by condition (ex. engine model).
1450	550	1.37	
1400	600	1.5	
1350	650	1.62	
1300	700	1.75	
1250	750	1.87	
1200	800	2	
1150	850	2.12	
1100	900	2.25	
1050	950	2.37	
1000	1000	2.5	

• The graph in relation with ENGINE SPEED and Vout (for reference)



ENGINE ACCELERATOR PROVIDED HINO GENUINE BY OPTION

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

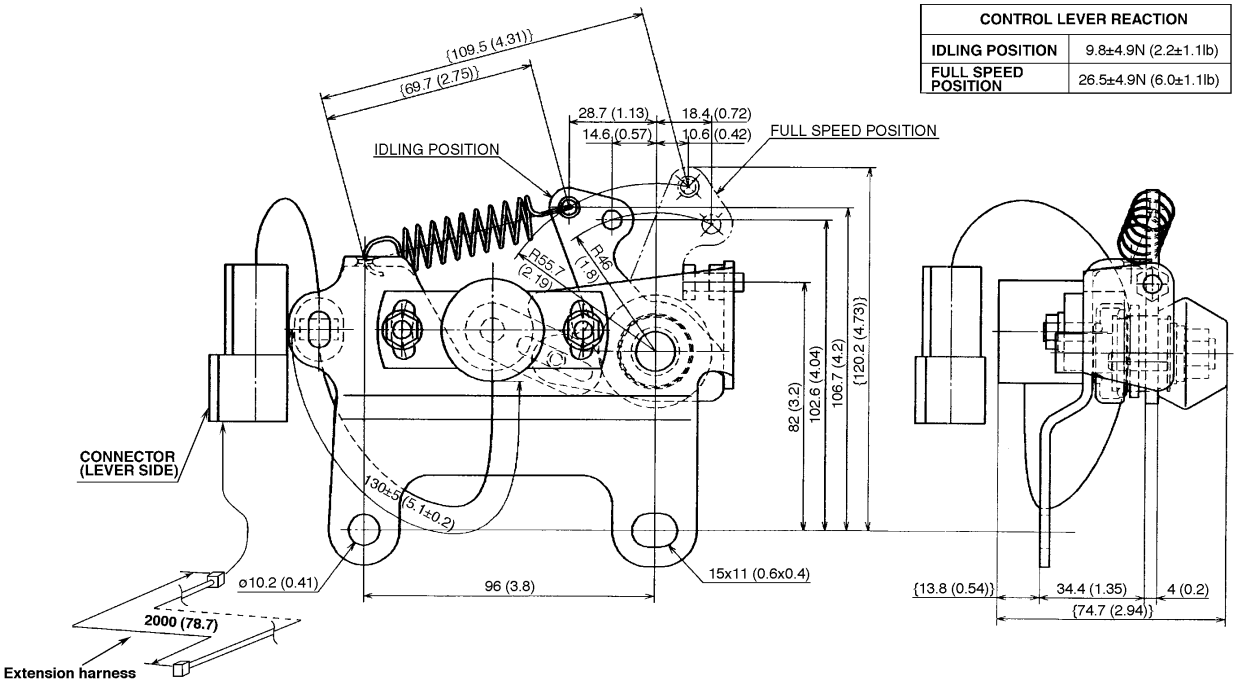
- Vehicle speed must be less than 20km/h (32mile/h).
- Transmission must be in neutral position.
- Engine speed must be reduced to idle.
- Engine accelerator unit must be idle position.
- PTO engagement signal must be connected to Engine Control ECU.

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.

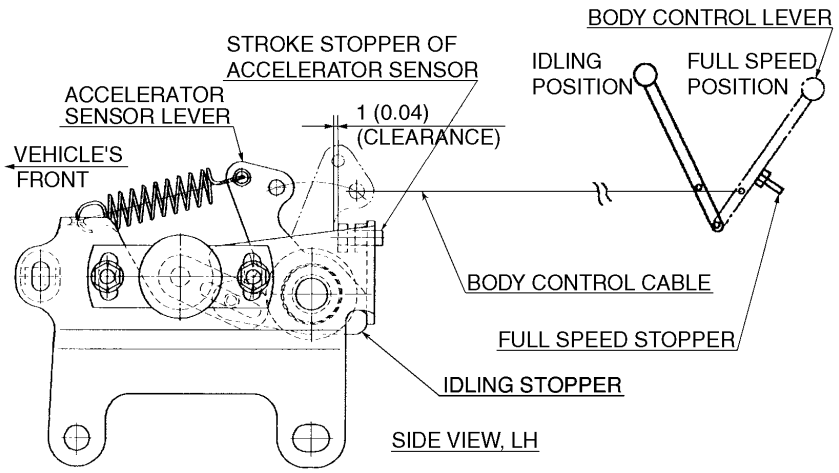
How to install the engine accelerator

Outline figure of Engine Accelerator Unit : mm (in.)



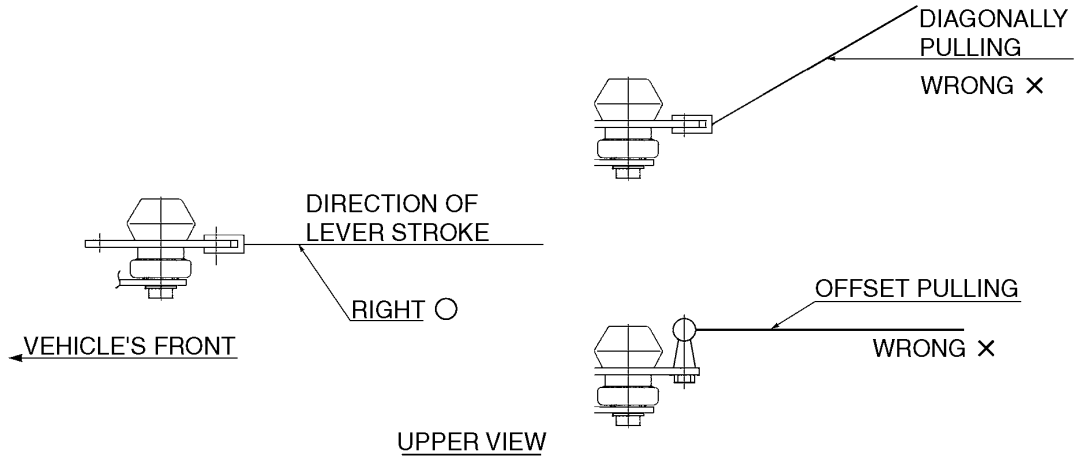
How to install

- 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 PTO 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

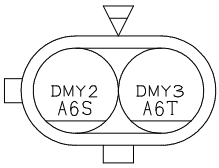
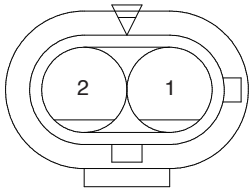
- Do not attempt to disassemble the sensor.
- Do not drop or otherwise shock the sensor, as this will lead to malfunction.
- Prevent water intrusion or direct splash.
- The sensor operating range is -30°C to 80°C (-22°F to 176°F) and should only be used in that range.
- Avoid mounting the sensor in an 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.

6. PTO SIGNAL FOR ALLISON TRANSMISSION

A connector for PTO control is provided.
Should connect the connector for PTO information to transmission control ECU when installing PTO to Allison transmission.

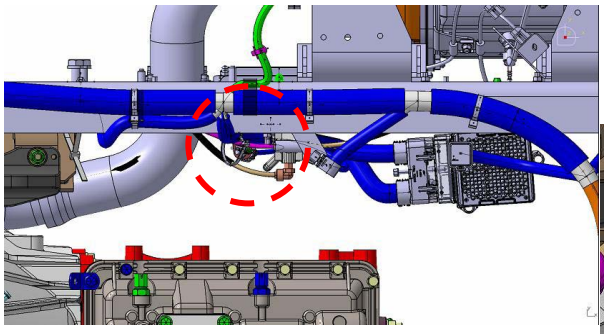
For control system data and other technical data related PTO installation, contact to ALLISON Transmission Division (ATD) distributers or dealers.

Detail of connector

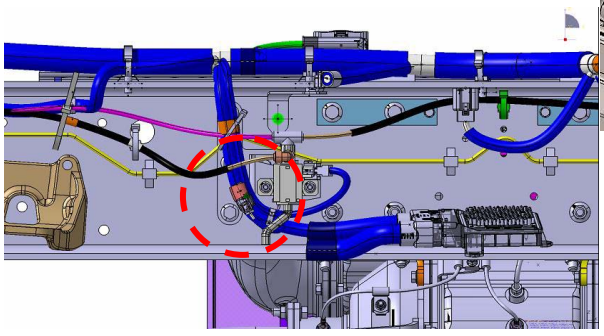
	CONNECTOR	COUPLING CONNECTOR
PTO_SERVICE		
	PART No. S8258 - 07180B	PART No. S8258 - 07170B
	WIRE SIZE & COLOR Pole Code A6S : 0.85 Y Pole Code A6T : 0.85 L	–

Installing position of connector

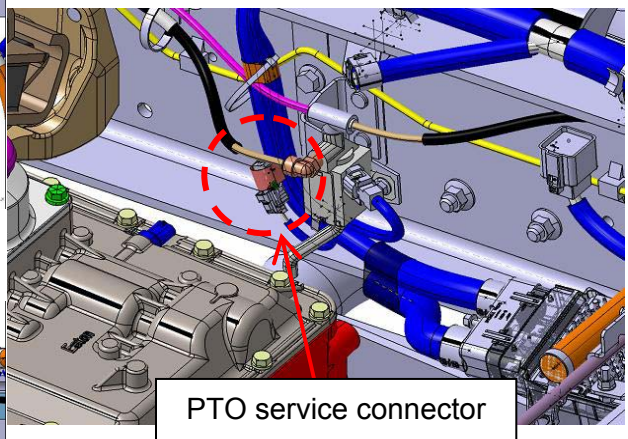
Installed at inside of frame right side member beside transmission as shown figure below.



UPPER VIEW



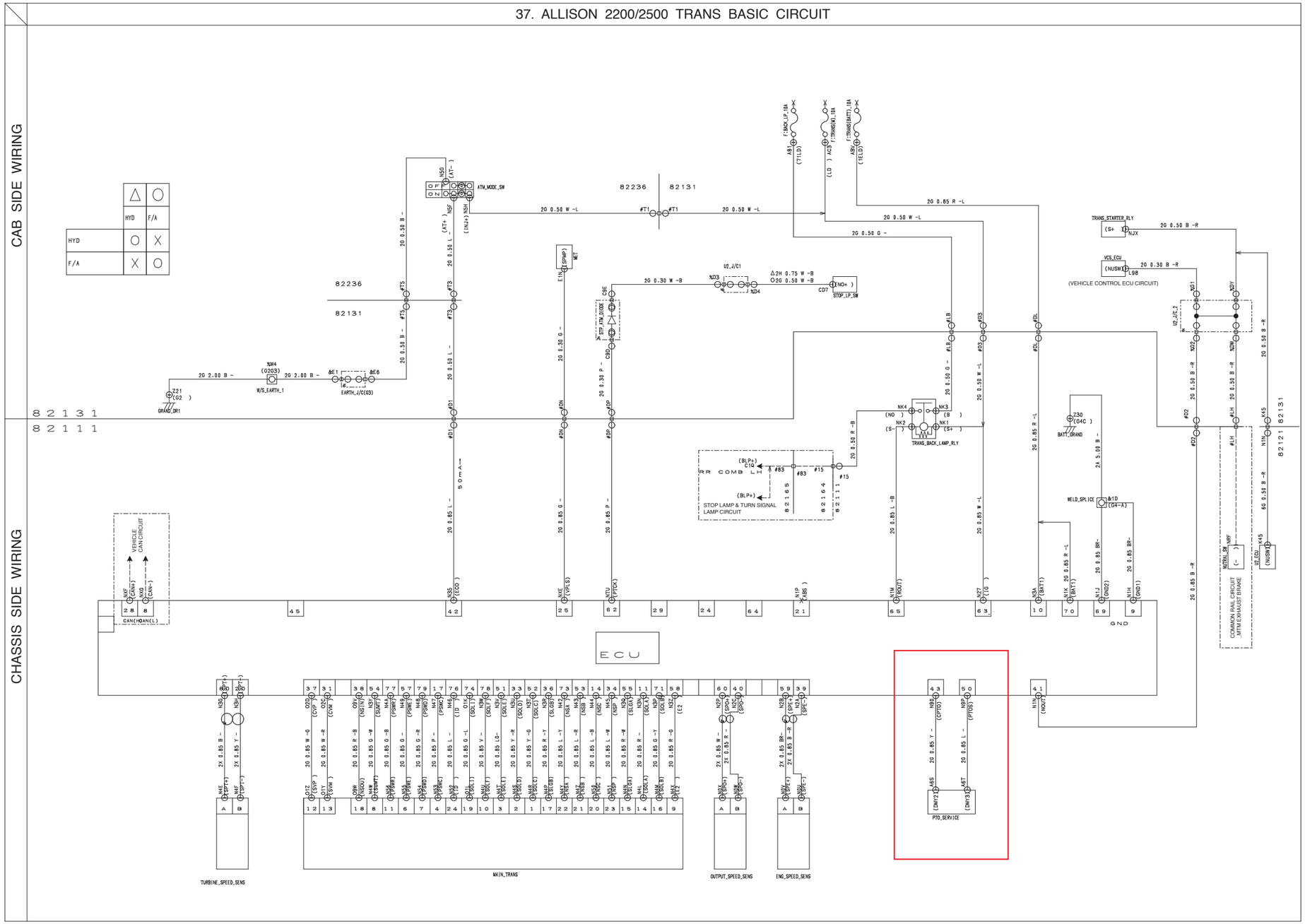
SIDE VIEW



PTO service connector

DETAIL OF WIRING DIAGRAM

Allison transmission 2200/2500 series



Allison transmission 3000 series