1312

G.M. - OPEL

Cassetta per la messa in fase del motore - G.M. - OPEL
Engine Timing Tool Kit - G.M. - OPEL
Coffret de calage et réglage de distribution – G.M. - OPEL
Arretierwerkzeug-Satz – G.M. - OPEL

Kit de Herramientas de Motor – G.M. - OPEL
Conjunto de Ferramentas para Regulação de Motores – G.M. - OPEL

USAG

Y802809

(IT) Cassetta per la messa in fase del motore - G.M. - OPEL

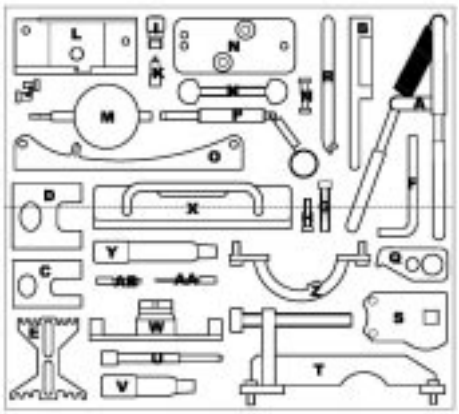
(GB) Engine Timing Tool Kit - G.M. - OPEL
This kit of tools is required for petrol and diesel engine service including timing belt replacement on many models as detailed below

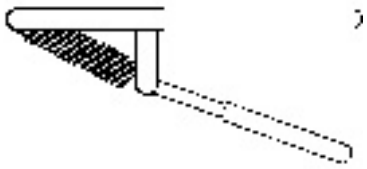
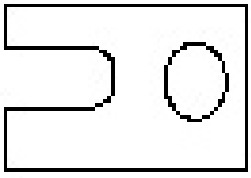
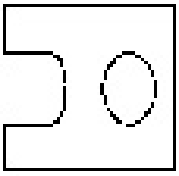
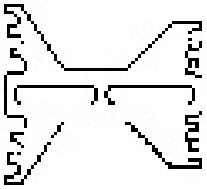
(FR) Coffret de calage et réglage de distribution – G.M. - OPEL
Cet équipement d'outils est exigé pour essence et service du moteur diesel et compris remplacement de la ceinture du réglage sur beaucoup de modèles comme détaillé au-dessous. Voir le tableau d'affectation fau les modéles spécifiques.

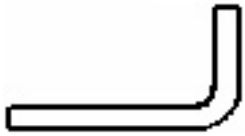
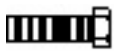
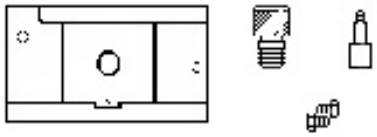
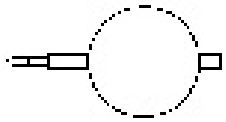
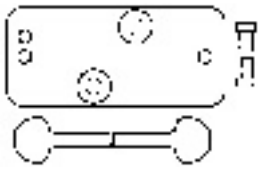
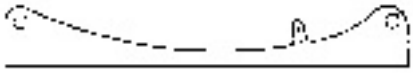
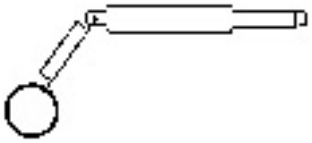
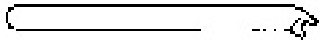
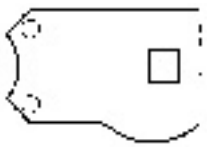
(DE) Arretierwerkzeug-Satz –G.M. - OPEL
Dieses Werkzeug von Werkzeugen wird für Benzin und Dieselöl-Motor-Dienst einschließlich Timing-Gürtel-Ersatzes auf vielen Modellen erfordert als ausführlich unter

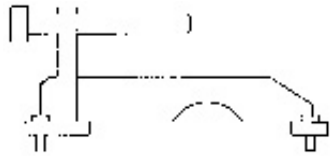
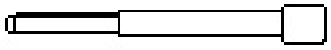
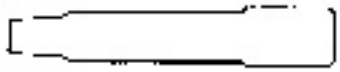
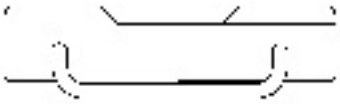
(ES) Kit de Herramientas de Motor – G.M. - OPEL
Este kit de herramientas se requiere para el servicio de motores de gasolina y diesel incluyendo el recambio de correa de tiempos (dentada) en muchos modelos como se detalla abajo:

(PT) Conjunto de Ferramentas para Regulação de Motores – G.M. - OPEL
Este conjunto de ferramentas é necessário para fazer o serviço dos motores de gasolina e de diesel, incluindo a substituição dos cintos de regulação em vários modelos, conforme detalhado a seguir



Ref.	OEM Ref.	(IT) / Designation / Description / Bezeichnung / (NL) / Descripción / Descrição / (PL)	
A 1312 A	KM 666	(IT) Utensile tenditore (GB) Tensioner adjuster (FR) Outil tendeur (DE) Spannwerkzeug (NL) (ES) Herramienta de tensado (PT) (PL)	
B 1312 B	KM 8070	(IT) Piastra per posizionamento albero a camme (GB) Camshaft Setting Bracket (FR) Règle de calage d'arbre à cames. (DE) Nockenwellen-Einstellineal (NL) (ES) Platina de posicionado del àrbol de levas (PT) Poleia de Assentamento do Eixo de Transmissão (PL)	
C 1312 C	KM 852	(IT) Utensile di fasatura albero a camme (GB) Camshaft Locking Tool (FR) Outil de calage d'arbre à cames (DE) Nockenwellen-Sicherungswerkzeug (NL) (ES) Herramienta de bloques de àrbol de levas (PT) Ferramenta de Travagem do Eixo de Transmissão (PL)	
D 1312 D	KM 853	(IT) Utensile di fasatura albero a camme (GB) Camshaft Locking Tool (FR) Outil de calage d'arbre à cames (DE) Nockenwellen-Sicherungswerkzeug (NL) (ES) Herramienta de bloques de àrbol de levas (PT) Ferramenta de Travagem do Eixo de Transmissão (PL)	
E 1312 E		(IT) Utensile di bloccaggio volano motore (GB) Flywheel locking tool (FR) Outil de blocage de volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Herramienta de bloqueo del cigüeñal (PT) (PL)	

Ref.	OEM Ref.	Designation / Description / Bezeichnung / (NL) / Descripción / (IT) / Descrição / (P	
F 1312 F		(IT) Perno di bloccaggio volano motore 9,5 mm (GB) Flywheel locking pin Ø 9,5 mm (FR) Pige de blocage du volant moteur Ø 9,5 mm (DE) Schwungrad-Fixierdorn Ø 9,5 mm (NL) (ES) Chaveta de reglaje del cigüeñal Ø 9,5 mm (PT) (PL)	
G 1312 G		(IT) Bullone M8 x 40 mm (GB) Locking screw M8 x 40 mm (FR) Boulon M8 x 40 mm (DE) Schraube M8 x 40 mm (NL) (ES) Tornillo M8 x 40 mm (PT) (PL)	
H 1312 H		(IT) Bullone M8 x 40 mm (GB) Locking screw M8 x 40 mm (FR) Boulon M8 x 40 mm (DE) Schraube M8 x 40 mm (NL) (ES) Tornillo M8 x 40 mm (PT) (PL)	
I 1312 I	KM 661-1	(IT) Utensili di fasatura albero a camme (GB) Camshaft Locking Tool (FR) Outil de calage d'arbre à cames (DE) Nockenwellen-Sicherungswerkzeug (NL) (ES) Herramienta de bloques de àrbol de levas (PT) Ferramenta de Travagem do Eixo de Transmissão (PL)	
J 1312 J	KM 571-B	(IT) Comparatore 51 x 10 x 0,01 mm (GB) Dial test indicator 51 Dia. x 10 x 0,01 mm (FR) Comparateur Ø 51 x 10 x 0,01 mm (DE) Messuhr Ø 51 x 10 x 0,01 mm (NL) (ES) Comparador Ø 51 x 10 x 0,01 mm (PT) h (PL)	
K 1312 K	KM 661-2	(IT) Utensile di posizionamento albero a camme (GB) Camshaft position locking tool (FR) Outil de blocage d'arbre à cames (DE) Nockenwellen-Fixierwerkzeug (NL) (ES) Herramienta de bloqueo del àrbol de levas (PT) (PL)	
L 1312 L	KM 851	(IT) Utensile di regolazione PMS (GB) TDC indicator (FR) Outil de réglage PMH (DE) (NL) (ES) (PT) (PL)	
M 1312 M	KM 951	(IT) Perno di fasatura volano motore (GB) Flywheel locking pin (FR) Pige de calage du volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Chaveta de reglaje del cigüeñal (PT) (PL)	
N 1312 N	KM 652	(IT) Utensile di bloccaggio del volano motore (GB) Flywheel locking tool (FR) Outil de blocage de volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Herramienta de bloqueo del cigüeñal (PT) (PL)	
O 1312 O	KM 911	(IT) Utensile di bloccaggio volano motore (GB) Flywheel locking tool (FR) Outil de blocage de volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Herramienta de bloqueo del cigüeñal (PT) (PL)	
P 1312 P	KM 933	(IT) Chiave di fasatura (GB) Timing adjustmant wrench (FR) Clé de calage (DE) (NL) (ES) (PT) (PL)	

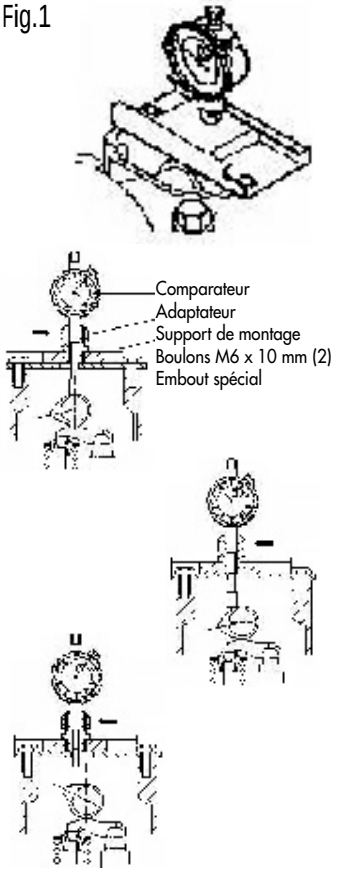
Ref.	OEM Ref.	Designation / Description / Bezeichnung / (NL) / Descripción / (IT) / Descrição / (P	
Q 1312 Q	KM 933	(IT) Utensile di fasatura (GB) Timing adjustment wrench (FR) Outil de calage (DE) (NL) (ES) (PT) (PL)	
R 1312 R	KM 927	(IT) Perno di posizionamento pignone pompa iniezione (GB) Injection Pump Pulley Timing Pin (FR) Pige de calage du pignon de pompe d'injection (DE) Einspritzpumpenrad – Fixierdorn (NL) (ES) Chaveta de bloqueo del piñón de bomba de inyección (PT) Pino de Travagem da Polia da Bomba de Injecção (PL)	
S 1312 S	KM 929	(IT) Perno di bloccaggio volano motore (GB) Flywheel locking pin (FR) Pige de blocage du volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Chaveta de reglaje del cigüeñal (PT) (PL)	
T 1312 T	KM 932	(IT) Utensile di fasatura albero a camme (GB) Camshaft Locking Tool (FR) Outil de calage d'arbre à cames (DE) Nockenwellen-Sicherungswerkzeug (NL) (ES) Herramienta de bloques de àrbol de levas (PT) Ferramenta de Travagem do Eixo de Transmissão (PL)	
U 1312 U	KM 953	(IT) Utensile di fasatura albero a camme (GB) Camshaft Locking Tool (FR) Outil de calage d'arbre à cames (DE) Nockenwellen-Sicherungswerkzeug (NL) (ES) Herramienta de bloques de àrbol de levas (PT) Ferramenta de Travagem do Eixo de Transmissão (PL)	
V 1312 V	KM 952	(IT) Perno di bloccaggio volano motore (GB) Flywheel locking tool (FR) Pige de blocage de volant moteur (DE) Kerbenwellen-Fixierdorn (NL) (ES) Chaveta de reglaje del cigüeñal (PT) (PL)	
W 1312 W	KM 954	(IT) (GB) Timing disc position gauge (FR) (DE) (NL) (ES) (PT) (PL)	
X 1312 X	KM 955	(IT) Perno di ritenuta tensionatore (GB) Tensioner retaining pin (FR) (DE) (NL) (ES) (PT) (PL)	
Y 1312 Y	KM 955	(IT) Perno di ritenuta tensionatore (GB) Tensioner retaining pin (FR) Outil de blocage de volant moteur (DE) Schwungrad-Fixierdorn (NL) (ES) Herramienta de bloqueo del cigüeñal (PT) (PL)	

Mode d'emploi – Il faut toujours se référer au manuel d'entretien du constructeur automobile ou à un manuel d'instructions approprié du constructeur.
Avertissement – Le calage incorrect ou déphasé de la distribution d'un moteur aura pour résultat le dégât des soupapes. Il est toujours conseillé de tourner le moteur lentement, manuellement, et de contrôler à nouveau les positions de calage de distribution de l'arbre à cames et du vilebrequin.

Contrôle de la distribution - Utilisation pour Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Outil de réglage d'arbre à cames :
NOTE. FT 23064 L'outil de réglage d'arbre à cames est utilisé avec l'outil de blocage d'arbre à cames associé FT 23163.
FT 23064-06 est utilisé avec le comparateur, FT 23070 et l'adaptateur FT23064-01, qui remplace l'embout standard avec l'embout spécial FT 23064-05 Voir la Fig. 1
Assurer que tous les repères de distribution s'alignent au vilebrequin (ou, en utilisant FT 23164-01 ou FT 23164-02), à la pompe d'injection.
Effectuer la procédure de tension de la courroie de distribution conformément aux instructions du constructeur. La tension de la courroie de distribution doit être correcte.
Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'à 90 degrés avant le PMH (1er cylindre). Insérer et fixer le comparateur à cadran dans la plaque de réglage. L'arbre du comparateur doit être solidement fixé dans l'adaptateur.
Retenir initialement l'arbre du comparateur en pinçant légèrement celui-ci avec l'écrou.
1/. Fixer la plaque de montage dans les trous de logement de l'arbre à cames, en utilisant les 2 vis sans tête M6, à la soupape d'admission du 1er cylindre (au-dessus du bossage de la 2ème came de l'avant).
2/. Pousser la plaque vers la droite afin que celle-ci s'appuie contre la position de butée droite. Le pied du comparateur doit s'appuyer sur le cercle de base de la came.
3/. Desserrer l'écrou et établir la charge d'étalonnage à une valeur n'excédant pas 0,50 mm, puis serrer solidement le comparateur dans l'adaptateur.
4/. Mettre la collerette du comparateur à zéro (point de repère)
5/. Pousser le bloc vers la gauche afin que celui-ci s'appuie contre la position de butée gauche, afin que le comparateur s'appuie sur le bossage de la came.
REMARQUE : Le comparateur mesurera sous le point de repère.
6/. Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'au PMH en s'assurant que tous les repères de distribution sont alignés. Le bossage de came montera et le comparateur retournera au point de repère du zéro et continuera jusqu'à la valeur nominale correcte 0,55 +/- 0,03 mm. Si la valeur nominale n'est pas obtenue, le calage de distribution de la came doit être réglé.

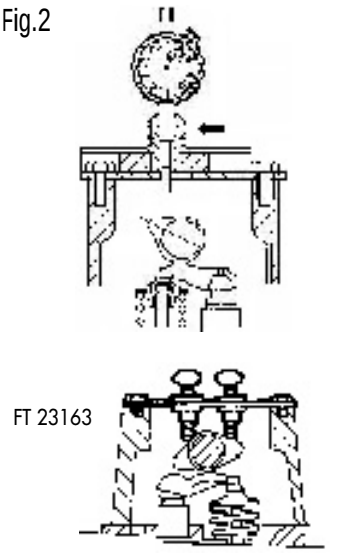
Fig.1



Réglage de la distribution.

S'assurer que la tension de la courroie de distribution est correcte. Tous les repères de distribution doivent être alignés et le moteur doit être au PMH.
En utilisant une clé à fourche de 22 mm. sur l'hexagone de l'arbre à cames afin d'empêcher la rotation de celui-ci, desserrer le boulon de fixation du pignon d'arbre à cames. Il est important que la position relative du vilebrequin et de l'arbre à cames reste inchangée.
En utilisant la clé, tourner ensuite l'arbre à cames dans le sens de rotation normal du moteur jusqu'à ce que le comparateur indique environ 0,80 mm. En utilisant la clé, tourner ensuite l'arbre à cames dans le sens inverse au sens de rotation normal du moteur jusqu'à ce que le comparateur indique 0,60 à 0,64 mm. Il est important que l'arbre à cames ne bouge pas de cette position. Monter l'outil de blocage d'arbre à cames FT 23163 à n'importe laquelle des trois autres positions de cylindre et régler en vissant les vis moletées jusqu'à ce que celles-ci touchent les bossages de came. Voir la Fig. 2. Monter un nouveau boulon pour retenir le pignon d'arbre à cames et serrer celui-ci au couple spécifié. Démonter les deux outils de réglage de la distribution, mais ne pas changer le réglage du comparateur.
Tourner le vilebrequin deux tours complets jusqu'aux repères de calage de distribution corrects. Remonter l'outil de mesure d'arbre à cames, en assurant que le comparateur est dans la position de butée gauche, avec le comparateur appuyé sur le bossage de came. Contrôler que la valeur de mesure nominale correcte 0,55 +/- 0,03 mm est indiquée.

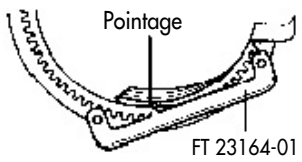
Fig.2



Outil de réglage du volant moteur au PMH - Vauxhall/Opel, moteur 17DTL (-97)

Pendant le démontage / l'installation d'une courroie de distribution et le réglage ou le contrôle de la position de calage de distribution correcte, l'outil de réglage du volant moteur est utilisé pour déterminer la position du volant moteur /vilebrequin au PMH. L'outil est fixé au carter de volant moteur et procure la position de pointage avec laquelle la marque de PMH est alignée.

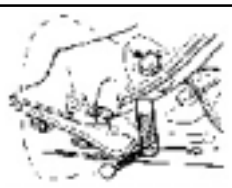
Fig.3



Piges de blocage de volant moteur / vilebrequin

Ces broches sont conçues pour localiser avec précision et bloquer le moteur au point mort haut (PMH) par l'alignement d'un trou repère dans le carter de volant moteur /de moteur avec le volant moteur. Placer la broche correcte dans le trou d'accès et faire tourner manuellement le moteur jusqu'à ce que la broche de blocage s'engage dans le trou de calage du volant moteur. Le moteur est alors bloqué dans la position de calage de distribution correcte.

Fig.4



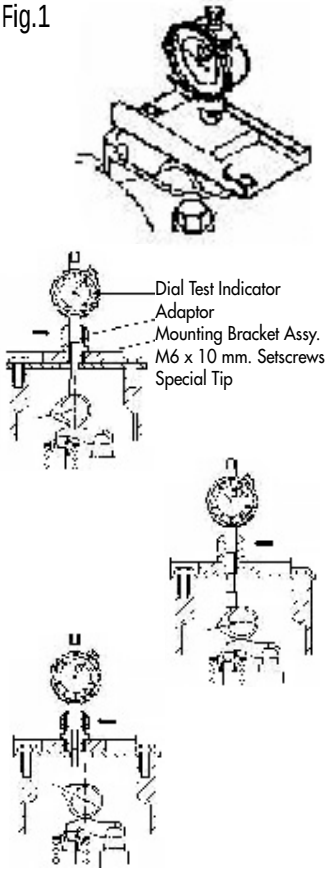
GB

Instructions for use – Always refer to the vehicle manufacturer's service manual or a suitable proprietary instruction book.
Warning – Incorrect or out of phase engine timing can result in damage to the valves. It is always recommended to turn the engine slowly, by hand, and to re-check the camshaft and crankshaft timing positions.

Checking timing. for use on Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Camshaft Setting Tool:-
NOTE FT 23064 Camshaft Setting Tool is used with associated FT 23163 Camshaft Locking Tool.
FT 23064-06 is used with the Dial Test Indicator using the Adapter Assembly FT 23064-01 and replacing the Standard Tip on the Dial Test Indicator with Special Tip FT 23064-05 See Fig. 1
Ensure all timing marks align at crankshaft by using (FT 23164-01 or FT 23164-02), and at the injection pump. Carry out the timing belt tensioning procedure as per the manufacturers instructions. The Belt tension must be correct.
Turn crankshaft in the normal engine direction of rotation to 90 degrees before TDC (1st cylinder). Insert and fix Dial Test Indicator into Setting Plate. The DTI shaft must be held securely in the Adapter.
Initially retain the DTI shaft by lightly pinching with the Nut.
1/. Fix the Mounting Plate into the camshaft housing holes, by using the 2 x M6 x 10 mm. Setscrews, at 1st cylinder inlet valve (over 2nd cam lobe from front).
2/. Push Plate to the right to rest against the right stop position. The DTI foot should rest on the base circle of the cam.
3/. Release the Nut and pre-load the indicator to not more than 0.50 mm. and secure the (DTI) firmly in the Adaptor.
4/. Zero the DTI bezel (datum point)
5/. Push the Block to the left to rest against the left stop position so that the indicator rests over the cam lobe.
NOTE: The dial test indicator will now read below the datum point.
6/. Turn crankshaft in the normal engine direction to TDC ensuring all timing marks align. The cam lobe will rise and the DTI will return to the zero datum point and continue to the correct nominal value 0.55 +/- 0.03mm. If the nominal value is not obtained, the cam timing must be adjusted.

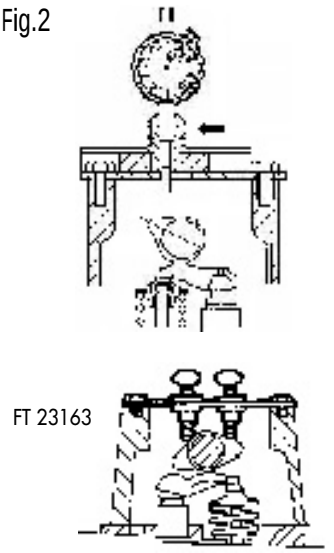
Fig.1



Adjusting Timing:

Ensure that the timing belt tension is correct. All timing marks must be aligned and the engine at TDC.
Using a 22 mm. open-ended spanner on the camshaft hexagon to stop it from turning, loosen the fastening bolt of the camshaft sprocket. It is important that the position of the crankshaft and camshaft remain unchanged.
The Camshaft should now be turned using the spanner in the normal direction of rotation until the dial test indicator reads approximately 0,80mm. Then using the spanner, turn the camshaft back in the opposite direction of normal rotation until the Dial Test Indicator reads 0,60-0,64mm. It is important that the camshaft does not move from this position. Fit the Camshaft Locking Tool FT 23163 to any of the remaining three cylinder positions, and adjust the thumbscrews down until they make contact with the cam lobes. See Fig.2. Fit a new bolt to retain the camshaft sprocket and tighten to the specified torque. Remove both timing tools, but do not change the Dial Test Indicator setting.
Rotate the crankshaft two full revolutions to the correct timing marks. Re-install the camshaft measuring tool, ensuring that the Dial Test Indicator is in the left stop position, with the (DTI) resting on the cam lobe. Check that the correct nominal measurement reading is shown as 0,55 +/- 0,03mm.

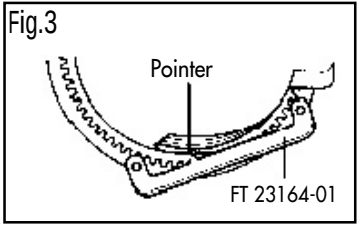
Fig.2



Flywheel TDC Setting Tool - Vauxhall/Opel, 17DTL engine (-97)

When removing/installing timing belt and establishing or checking correct timing position, the Flywheel Setting Tool is used to determine the flywheel/crankshaft TDC position. It is attached to the flywheel housing and provides the 'pointer' position on which to align the TDC mark.

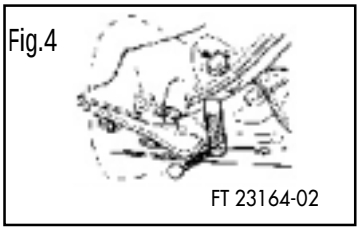
Fig.3



Flywheel / Crankshaft Locking Tools.

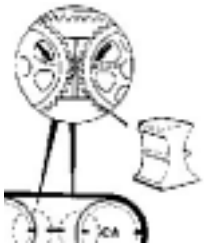
These are designed to pin-point and lock the engine at Top Dead Centre (TDC) by alignment of a datum hole in the flywheel / engine casing and the flywheel. Place the correct Pin in the access hole and rotate the engine by hand until the locking pin engages with the flywheel timing hole, the engine is now locked in the correct timing position.

Fig.4



Twin-Cam Locking Tools. These tools enable the camshafts to be locked in relationship to each other because the pressure of the compressed valve springs can cause the position to change after the timing belt has been removed.
Changing the timing belt is made easier by locking the camshafts in position and reduces the risk of damage. Damage will occur to the valves if they make contact with the piston after the correct timing position of the camshafts is lost.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

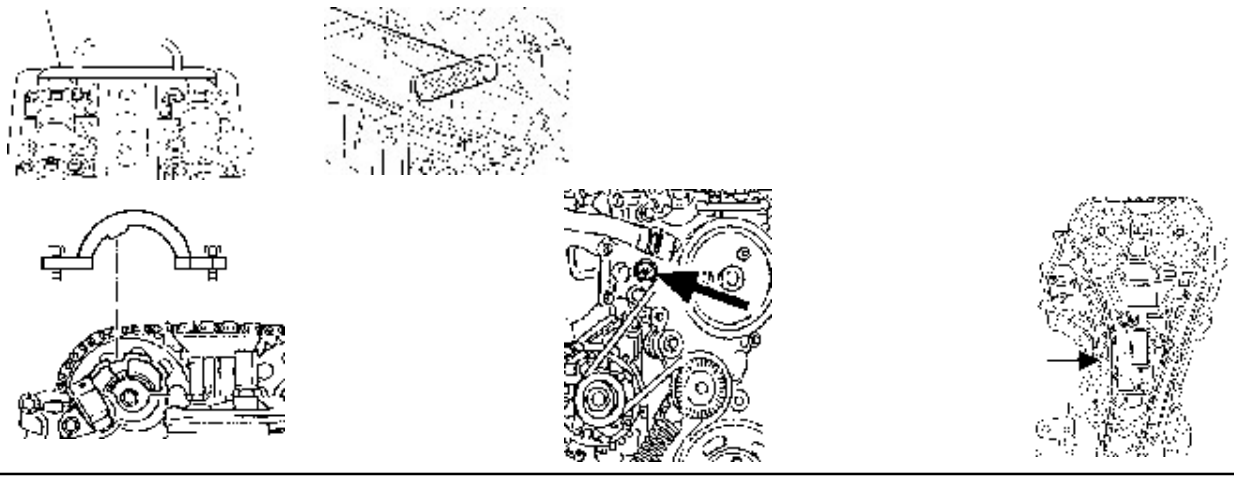
The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

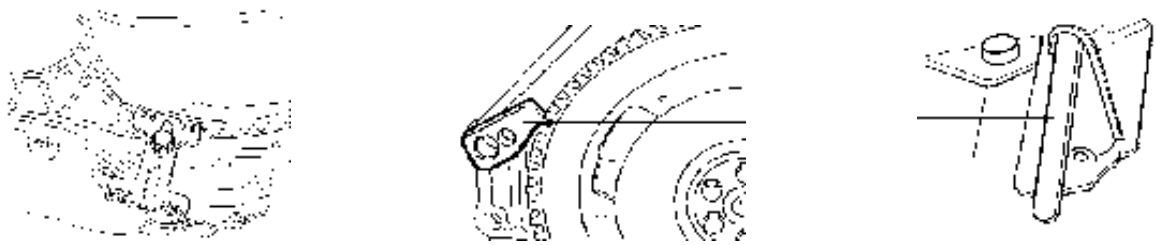
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



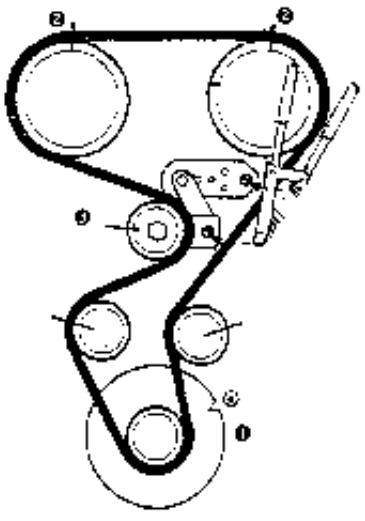
Flywheel Locking Tools.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

Fig.9



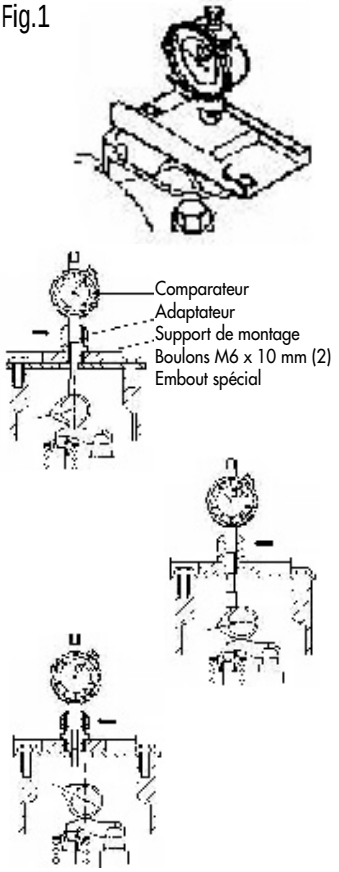
FR

Mode d'emploi – Il faut toujours se référer au manuel d'entretien du constructeur automobile ou à un manuel d'instructions approprié du constructeur.
Avertissement – Le calage incorrect ou déphasé de la distribution d'un moteur aura pour résultat le dégât des soupapes. Il est toujours conseillé de tourner le moteur lentement, manuellement, et de contrôler à nouveau les positions de calage de distribution de l'arbre à cames et du vilebrequin.

Contrôle de la distribution - Utilisation pour Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Outil de réglage d'arbre à cames :
NOTE. FT 23064 L'outil de réglage d'arbre à cames est utilisé avec l'outil de blocage d'arbre à cames associé FT 23163.
FT 23064-06 est utilisé avec le comparateur, FT 23070 et l'adaptateur FT23064-01, qui remplace l'embout standard avec l'embout spécial FT 23064-05 Voir la Fig. 1
Assurer que tous les repères de distribution s'alignent au vilebrequin (ou, en utilisant FT 23164-01 ou FT 23164-02), à la pompe d'injection.
Effectuer la procédure de tension de la courroie de distribution conformément aux instructions du constructeur. La tension de la courroie de distribution doit être correcte.
Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'à 90 degrés avant le PMH (1er cylindre). Insérer et fixer le comparateur à cadran dans la plaque de réglage. L'arbre du comparateur doit être solidement fixé dans l'adaptateur.
Retenir initialement l'arbre du comparateur en pinçant légèrement celui-ci avec l'écrou.
1/. Fixer la plaque de montage dans les trous de logement de l'arbre à cames, en utilisant les 2 vis sans tête M6, à la soupape d'admission du 1er cylindre (au-dessus du bossage de la 2ème came de l'avant).
2/. Pousser la plaque vers la droite afin que celle-ci s'appuie contre la position de butée droite. Le pied du comparateur doit s'appuyer sur le cercle de base de la came.
3/. Desserrer l'écrou et établir la charge d'étalonnage à une valeur n'excédant pas 0,50 mm, puis serrer solidement le comparateur dans l'adaptateur.
4/. Mettre la collerette du comparateur à zéro (point de repère)
5/. Pousser le bloc vers la gauche afin que celui-ci s'appuie contre la position de butée gauche, afin que le comparateur s'appuie sur le bossage de la came.
REMARQUE : Le comparateur mesurera sous le point de repère.
6/. Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'au PMH en s'assurant que tous les repères de distribution sont alignés. Le bossage de came montera et le comparateur retournera au point de repère du zéro et continuera jusqu'à la valeur nominale correcte 0,55 +/- 0,03 mm. Si la valeur nominale n'est pas obtenue, le calage de distribution de la came doit être réglé.

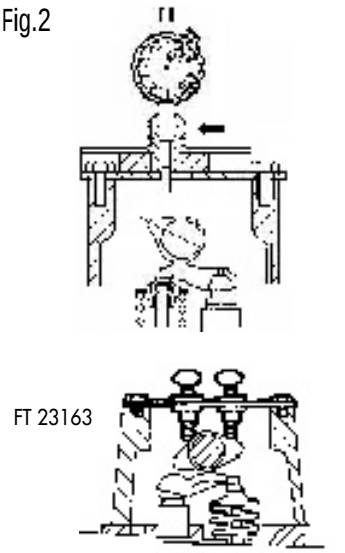
Fig.1



Réglage de la distribution.

S'assurer que la tension de la courroie de distribution est correcte. Tous les repères de distribution doivent être alignés et le moteur doit être au PMH.
En utilisant une clé à fourche de 22 mm. sur l'hexagone de l'arbre à cames afin d'empêcher la rotation de celui-ci, desserrer le boulon de fixation du pignon d'arbre à cames. Il est important que la position relative du vilebrequin et de l'arbre à cames reste inchangée.
En utilisant la clé, tourner ensuite l'arbre à cames dans le sens de rotation normal du moteur jusqu'à ce que le comparateur indique environ 0,80 mm. En utilisant la clé, tourner ensuite l'arbre à cames dans le sens inverse au sens de rotation normal du moteur jusqu'à ce que le comparateur indique 0,60 à 0,64 mm. Il est important que l'arbre à cames ne bouge pas de cette position. Monter l'outil de blocage d'arbre à cames FT 23163 à n'importe laquelle des trois autres positions de cylindre et régler en vissant les vis moletées jusqu'à ce que celles-ci touchent les bossages de came. Voir la Fig. 2. Monter un nouveau boulon pour retenir le pignon d'arbre à cames et serrer celui-ci au couple spécifié. Démonter les deux outils de réglage de la distribution, mais ne pas changer le réglage du comparateur.
Tourner le vilebrequin deux tours complets jusqu'aux repères de calage de distribution corrects. Remonter l'outil de mesure d'arbre à cames, en assurant que le comparateur est dans la position de butée gauche, avec le comparateur appuyé sur le bossage de came. Contrôler que la valeur de mesure nominale correcte 0,55 +/- 0,03 mm est indiquée.

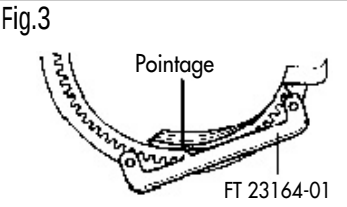
Fig.2



Outil de réglage du volant moteur au PMH - Vauxhall/Opel, moteur 17DTL (-97)

Pendant le démontage / l'installation d'une courroie de distribution et le réglage ou le contrôle de la position de calage de distribution correcte, l'outil de réglage du volant moteur est utilisé pour déterminer la position du volant moteur /vilebrequin au PMH. L'outil est fixé au carter de volant moteur et procure la position de pointage avec laquelle la marque de PMH est alignée.

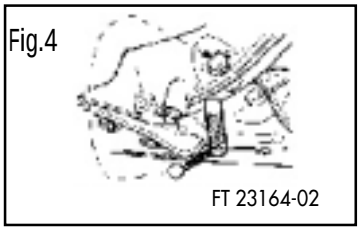
Fig.3



Piges de blocage de volant moteur / vilebrequin

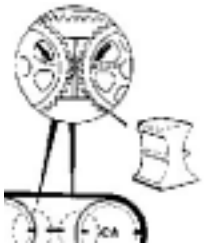
Ces broches sont conçues pour localiser avec précision et bloquer le moteur au point mort haut (PMH) par l'alignement d'un trou repère dans le carter de volant moteur /de moteur avec le volant moteur. Placer la broche correcte dans le trou d'accès et faire tourner manuellement le moteur jusqu'à ce que la broche de blocage s'engage dans le trou de calage du volant moteur. Le moteur est alors bloqué dans la position de calage de distribution correcte.

Fig.4



Outils de blocage pour les moteurs à double arbre à cames en tête. Ces outils permettent de bloquer les arbres à cames l'un par rapport à l'autre parce que la pression des ressorts de soupape peut provoquer le changement de position après le démontage de la courroie de distribution.
Le blocage des arbres à cames en position facilite le changement de la courroie de distribution et réduit tout risque de dégât.
Les soupapes seront endommagées si celle-ci touchent le piston après la perte de la position de calage correcte de la distribution.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

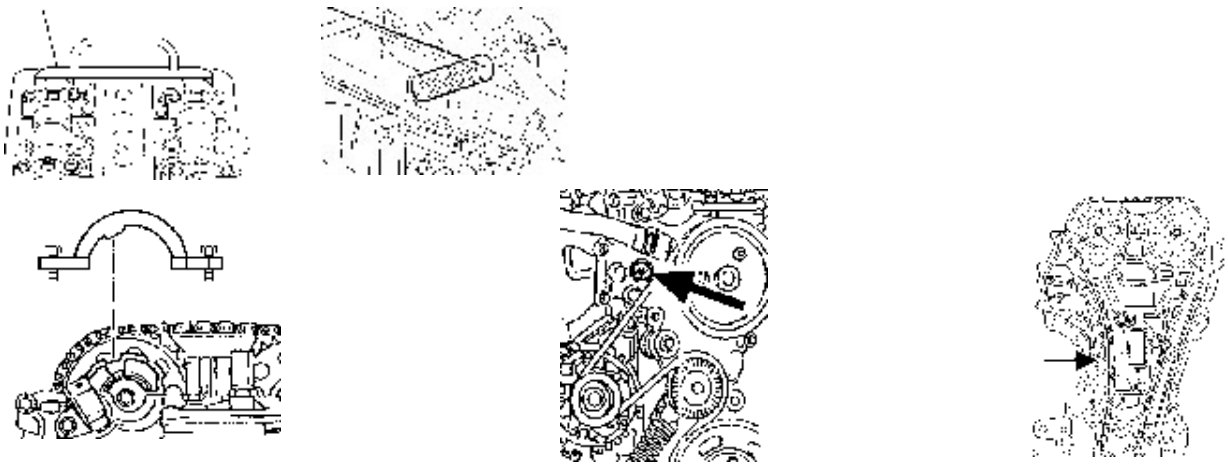
The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

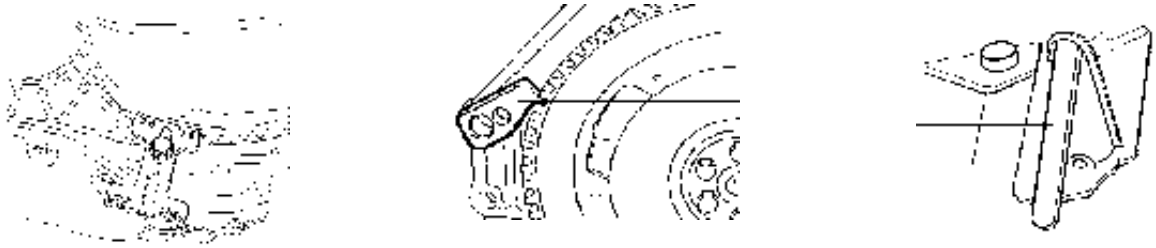
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



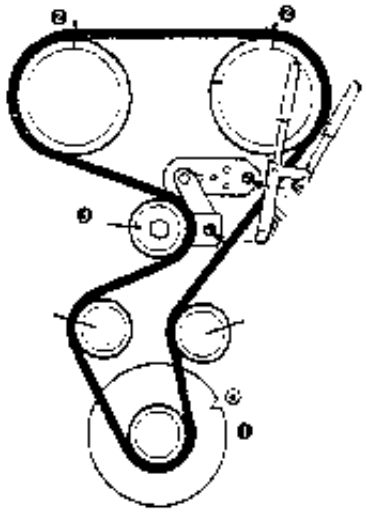
Outils de blocage de volant moteur.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

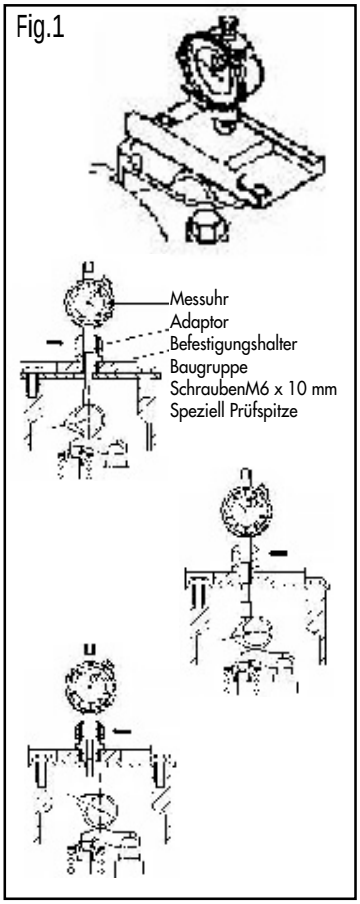
Fig.9



Achtung – Falsche oder phasenverschobene Motorsteuerung kann die Ventile beschädigen. Es wird daher immer empfohlen, den Motor langsam von Hand durchzudrehen und die Einstellungen der Nockenwelle sowie der Kurbelwelle neu zu kontrollieren.

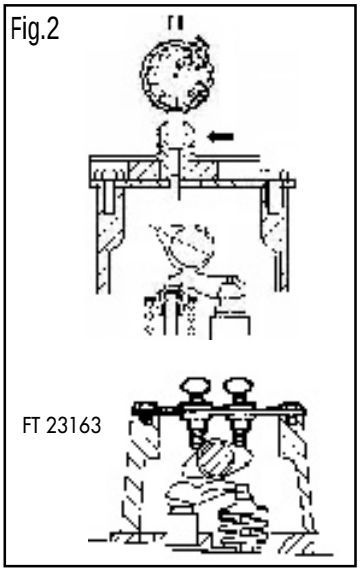
Steuerzeiten prüfen Für den Gebrauch bei Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL
Nockenwellen-Einstellwerkzeug
HINWEIS Nockenwellen Einstellwerkzeug wird mit zugehörigem FT 23163 Nockenwellen-Sicherungswerkzeug verwendet.
FT 23064-06 wird mit Messuhr und Adapterbaugruppe FT 23064-01 verwendet. Dabei muss die Standard-Prüfspitze der Messuhr gegen die spezielle Prüfspitze FT 23064-05 ausgetauscht werden. Siehe Abb. 1.
Sicherstellen, dass alle Einstellmarkierungen an der Kurbelwelle und an der Einspritzpumpe fluchten (oder durch Verwendung von FT 23164-01 oder FT 23164-02).
Zahnriemen gemäß Herstelleranweisungen spannen. Korrekte Riemenspannung sicherstellen.
Kurbelwelle in normaler Drehrichtung auf 90 Grad OT drehen (1. Zylinder). Messuhr in Einstellplatte einsetzen und sichern. Der Schaft der Messuhr muss sicher vom Adapter gehalten werden.
Schaft der Messuhr anfänglich durch leichtes Klemmen mit Mutter sichern.
1/. Befestigungsplatte am Einlassventil des 1. Zylinders (über dem 2. Nocken von vorn gesehen) an Bohrungen im Nockenwellengehäuse mit 2 x M6 Schrauben befestigen.
2/. Platte nach rechts gegen den Anschlag drücken. Fuß der Messuhr am Nockengrundkreis positionieren.
3/. Mutter lösen, Messuhr auf max. 0,50 mm. vorspannen und Messuhr sicher an Adapter befestigen.
4/. Messuhr nullen (Bezugspunkt).
5/. Block zum linken Anschlag schieben, so dass sich die Messuhr über dem Nocken befindet.
HINWEIS: Die Messuhr zeigt jetzt einen Wert unterhalb des Bezugspunktes an.
6/. Kurbelwelle in normaler Drehrichtung auf OT drehen und sicherstellen, dass alle Einstellmarkierungen fluchten. Der Nocken hebt sich und die Messuhr zeigt Null an und anschließend den korrekten Sollwert von 0,55 +/- 0,03mm. Wenn der Sollwert nicht erreicht wird, müssen die Steuerzeiten eingestellt werden.

Fig.1



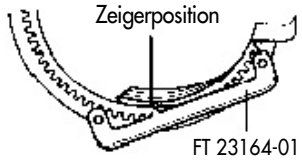
Steuerzeiten einstellen
Korrekte Zahnriemenspannung sicherstellen. Alle Einstellmarkierungen müssen fluchten und der Motor auf OT stehen.
Nockenwellen-Sechskant mit 22 mm-Maulschlüssel gegenhalten und Schraube des Nockenwellenkettenrads lösen. Sicherstellen, dass sich Kurbelwellen- und Nockenwellenpositionen nicht verändern.
Nockenwelle mit Maulschlüssel in normaler Drehrichtung drehen, bis die Messuhr ca. 0,80 mm anzeigt. Anschließend Nockenwelle mit Maulschlüssel gegen die normale Drehrichtung drehen, bis die Messuhr 0,60-0,64 mm anzeigt. Sicherstellen, dass die Nockenwelle in dieser Position verbleibt. Nockenwellensicherungswerkzeug CPD8511 an einen der übrigen drei Zylinder anbauen und Rändelschrauben nach unten drehen, bis sie die Nokken berühren. Siehe Abb. 10. Neue Schraube zur Sicherung des Nockenwellenkettenrads aufschrauben und mit angegebenem Drehmoment festziehen. Beide Einstellwerkzeuge abbauen, aber Einstellung der Messuhr nicht verändern.
Kurbelwelle zwei ganze Umdrehungen drehen , bis die korrekten Einstellmarkierungen erreicht sind.
Nockenwellenmesswerkzeug anbauen. Sicherstellen, dass sich die Messuhr am linken Anschlag befindet und auf dem Nocken aufliegt. Überprüfen, dass der korrekte Sollwert von 0,55 +/- 0,03 mm angezeigt wird.

Fig.2



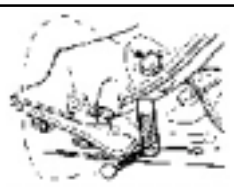
Schwungrad TDC-Einstellwerkzeug - Vauxhall/Opel, 17DTL Motor (-97)
Beim Entfernen/Installieren des Zahnriemens und der Einstellung oder Überprüfung der richtigen Einstellposition wird das Schwungrad-Einstellwerkzeug zur Bestimmung OT-Position des Schwungrads/der Kurbelwelle verwendet. Es ist am Schwungradgehäuse befestigt und stellt die Zeigerposition bereit, nach der das OT-Zeichen auszurichten ist.

Fig.3



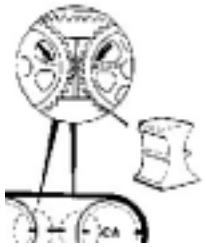
Schwungrad / Kurbelwellen-Sicherungsstifte. – Verwendung bei verschiedenen Fahrzeugtypen, siehe Anwendungsliste.
Diese sind so konstruiert, dass sie den Motor beim Oberen Totpunkt (OT) lokalisieren und durch Einstellung einer Zugangsbohrung in dem Schwungrad- / Motorgehäuse und dem Schwungrad sichern. Richtigen Stift in das Zugangsloch platzieren und den Motor von Hand drehen, bis der Sicherungsstift mit der Einstellbohrung des Schwungrades einfällt. Der Motor ist jetzt in der richtigen Einstellposition blockiert.

Fig.4



Doppelnocken-Sicherungswerkzeuge Mit diesen Werkzeugen können die Nockenwellen gegeneinander blockiert werden, da der Druck der gespannten Ventilfeder die Stellung verändern kann, nachdem der Zahnriemen entfernt wurde.
Das Wechseln des Zahnriemens wird durch das Blockieren der Nockenwellen vereinfacht und verringert das Beschädigungsrisiko.
Die Ventile werden beschädigt, wenn sie mit dem Kolben in Berührung kommen, nachdem die richtige Einstellposition der Nockenwelle verlorengegangen ist.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

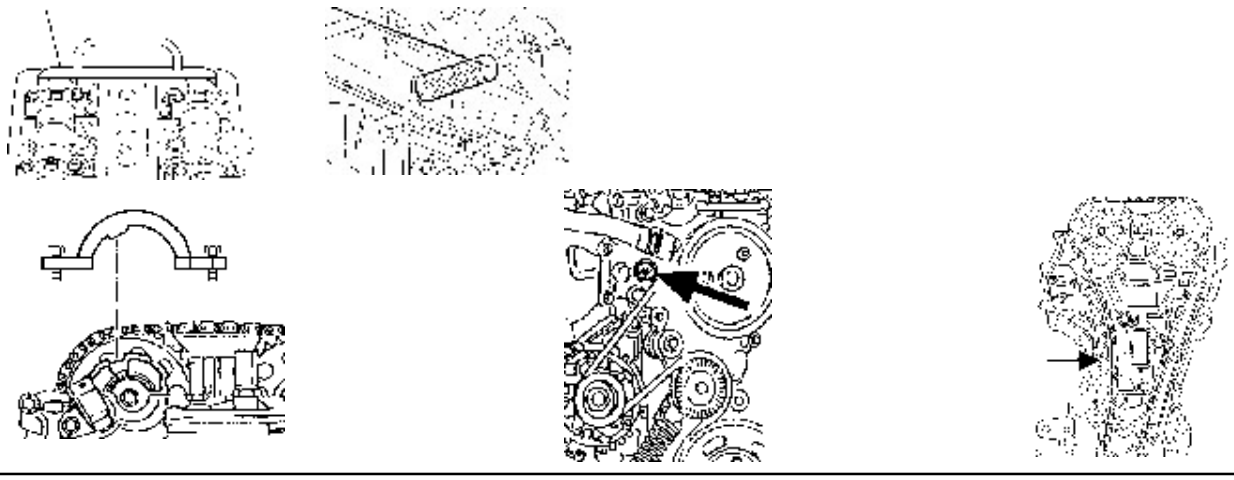
The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

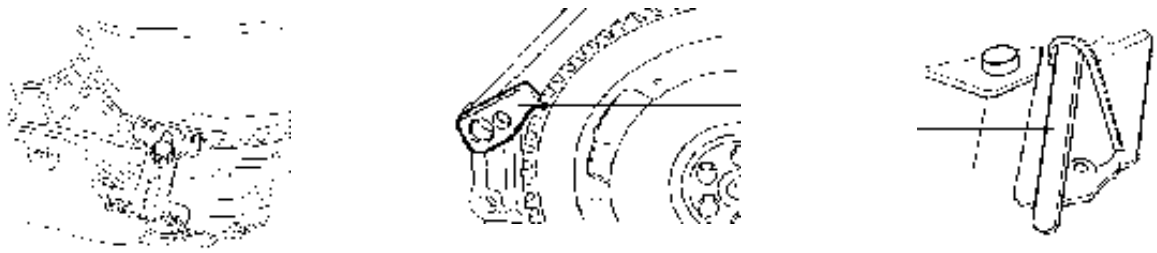
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



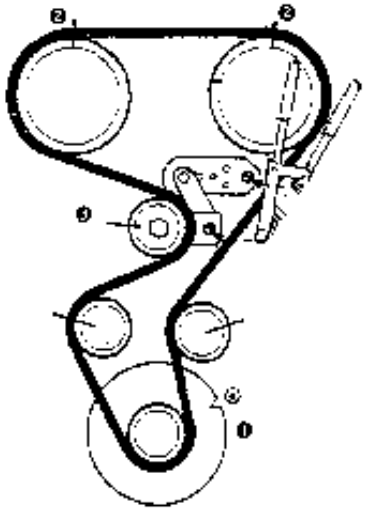
Outils de blocage de volant moteur.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

Fig.9



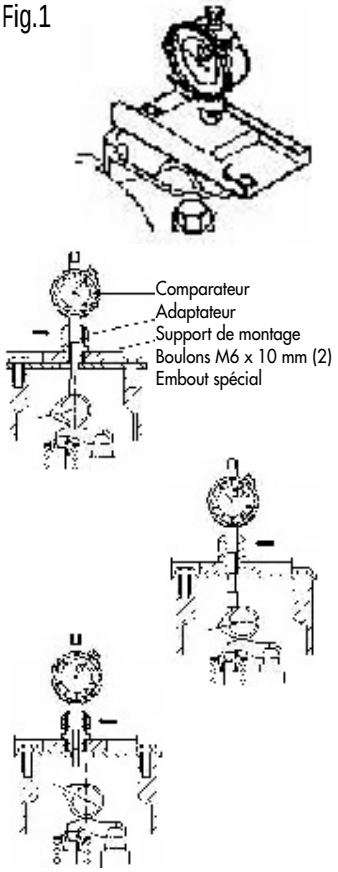
NL

Mode d'emploi – Il faut toujours se référer au manuel d'entretien du constructeur automobile ou à un manuel d'instructions approprié du constructeur.
Avertissement – Le calage incorrect ou déphasé de la distribution d'un moteur aura pour résultat le dégât des soupapes. Il est toujours conseillé de tourner le moteur lentement, manuellement, et de contrôler à nouveau les positions de calage de distribution de l'arbre à cames et du vilebrequin.

Contrôle de la distribution - Utilisation pour Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Outil de réglage d'arbre à cames :
NOTE. FT 23064 L'outil de réglage d'arbre à cames est utilisé avec l'outil de blocage d'arbre à cames associé FT 23163.
FT 23064-06 est utilisé avec le comparateur, FT 23070 et l'adaptateur FT23064-01, qui remplace l'embout standard avec l'embout spécial FT 23064-05 Voir la Fig. 1
Assurer que tous les repères de distribution s'alignent au vilebrequin (ou, en utilisant FT 23164-01 ou FT 23164-02), à la pompe d'injection.
Effectuer la procédure de tension de la courroie de distribution conformément aux instructions du constructeur. La tension de la courroie de distribution doit être correcte.
Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'à 90 degrés avant le PMH (1er cylindre). Insérer et fixer le comparateur à cadran dans la plaque de réglage. L'arbre du comparateur doit être solidement fixé dans l'adaptateur.
Retenir initialement l'arbre du comparateur en pinçant légèrement celui-ci avec l'écrou.
1/. Fixer la plaque de montage dans les trous de logement de l'arbre à cames, en utilisant les 2 vis sans tête M6, à la soupape d'admission du 1er cylindre (au-dessus du bossage de la 2ème came de l'avant).
2/. Pousser la plaque vers la droite afin que celle-ci s'appuie contre la position de butée droite. Le pied du comparateur doit s'appuyer sur le cercle de base de la came.
3/. Desserrer l'écrou et établir la charge d'étalonnage à une valeur n'excédant pas 0,50 mm, puis serrer solidement le comparateur dans l'adaptateur.
4/. Mettre la collerette du comparateur à zéro (point de repère)
5/. Pousser le bloc vers la gauche afin que celui-ci s'appuie contre la position de butée gauche, afin que le comparateur s'appuie sur le bossage de la came.
REMARQUE : Le comparateur mesurera sous le point de repère.
6/. Tourner le vilebrequin dans le sens de rotation normal du moteur jusqu'au PMH en s'assurant que tous les repères de distribution sont alignés. Le bossage de came montera et le comparateur retournera au point de repère du zéro et continuera jusqu'à la valeur nominale correcte 0,55 +/- 0,03 mm. Si la valeur nominale n'est pas obtenue, le calage de distribution de la came doit être réglé.

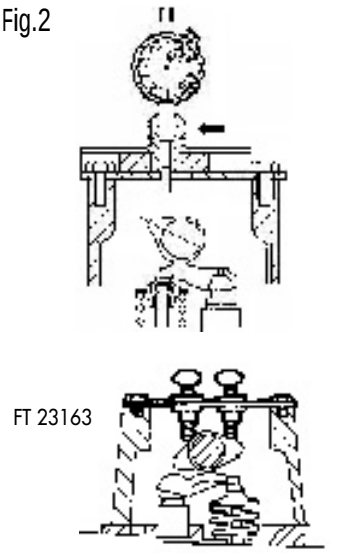
Fig.1



Réglage de la distribution.

S'assurer que la tension de la courroie de distribution est correcte. Tous les repères de distribution doivent être alignés et le moteur doit être au PMH.
En utilisant une clé à fourche de 22 mm. sur l'hexagone de l'arbre à cames afin d'empêcher la rotation de celui-ci, desserrer le boulon de fixation du pignon d'arbre à cames. Il est important que la position relative du vilebrequin et de l'arbre à cames reste inchangée.
En utilisant la clé, tourner ensuite l'arbre à cames dans le sens de rotation normal du moteur jusqu'à ce que le comparateur indique environ 0,80 mm. En utilisant la clé, tourner ensuite l'arbre à cames dans le sens inverse au sens de rotation normal du moteur jusqu'à ce que le comparateur indique 0,60 à 0,64 mm. Il est important que l'arbre à cames ne bouge pas de cette position. Monter l'outil de blocage d'arbre à cames FT 23163 à n'importe laquelle des trois autres positions de cylindre et régler en vissant les vis moletées jusqu'à ce que celles-ci touchent les bossages de came. Voir la Fig. 2. Monter un nouveau boulon pour retenir le pignon d'arbre à cames et serrer celui-ci au couple spécifié. Démonter les deux outils de réglage de la distribution, mais ne pas changer le réglage du comparateur.
Tourner le vilebrequin deux tours complets jusqu'aux repères de calage de distribution corrects. Remonter l'outil de mesure d'arbre à cames, en assurant que le comparateur est dans la position de butée gauche, avec le comparateur appuyé sur le bossage de came. Contrôler que la valeur de mesure nominale correcte 0,55 +/- 0,03 mm est indiquée.

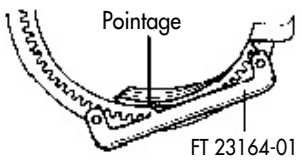
Fig.2



Outil de réglage du volant moteur au PMH - Vauxhall/Opel, moteur 17DTL (-97)

Pendant le démontage / l'installation d'une courroie de distribution et le réglage ou le contrôle de la position de calage de distribution correcte, l'outil de réglage du volant moteur est utilisé pour déterminer la position du volant moteur /vilebrequin au PMH. L'outil est fixé au carter de volant moteur et procure la position de pointage avec laquelle la marque de PMH est alignée.

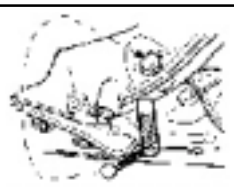
Fig.3



Piges de blocage de volant moteur / vilebrequin

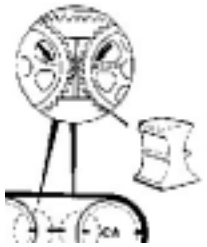
Ces broches sont conçues pour localiser avec précision et bloquer le moteur au point mort haut (PMH) par l'alignement d'un trou repère dans le carter de volant moteur /de moteur avec le volant moteur. Placer la broche correcte dans le trou d'accès et faire tourner manuellement le moteur jusqu'à ce que la broche de blocage s'engage dans le trou de calage du volant moteur. Le moteur est alors bloqué dans la position de calage de distribution correcte.

Fig.4



Twin-Cam Locking Tools. These tools enable the camshafts to be locked in relationship to each other because the pressure of the compressed valve springs can cause the position to change after the timing belt has been removed.
Changing the timing belt is made easier by locking the camshafts in position and reduces the risk of damage. Damage will occur to the valves if they make contact with the piston after the correct timing position of the camshafts is lost.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
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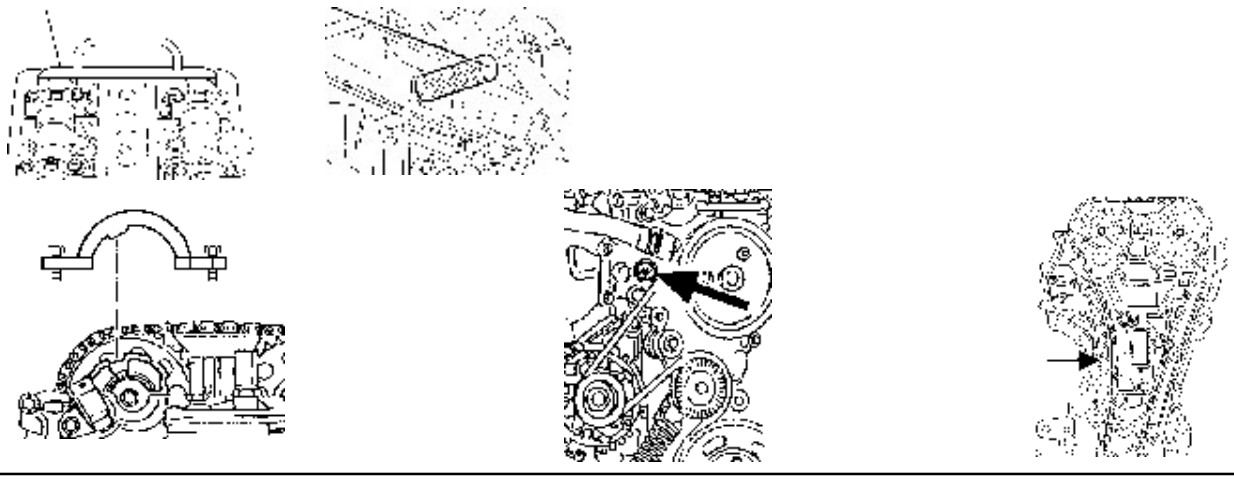
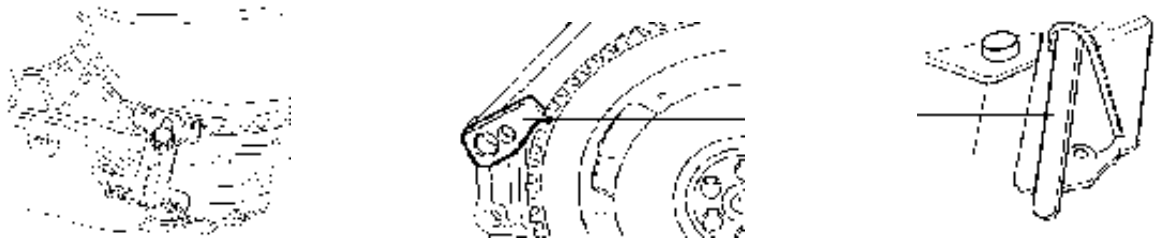
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



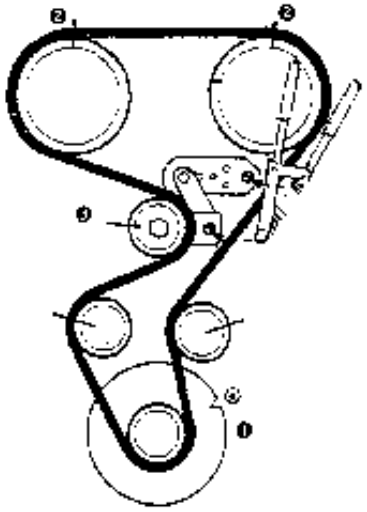
Flywheel Locking Tools.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

Fig.9



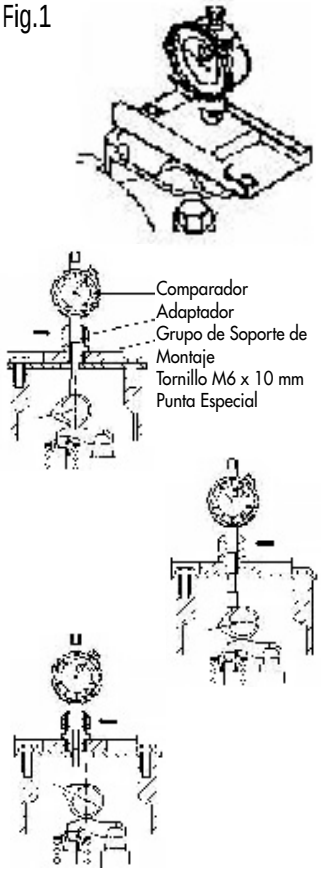
ES

Instrucciones de uso – Referirse siempre al manual de servicio del fabricante del coche o a un libro adecuado de instrucciones propietarias. Advertencia – Los tiempos (poner a punto) incorrectos o fuera de fase pueden resultar en daño a las válvulas. Se recomienda girar siempre el motor lentamente, a mano, y rechequear las posiciones de tiempo (poner a punto) del eje de levas y cigüeñal.

Chequeo de Tiempos - Para utilizar en el Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Herramienta de Consigna de Eje de Levas
NOTA FT 23064 La Herramienta de Consigna de Eje de Levas se utiliza con la Herramienta asociada de Seguridad de Eje de Levas FT 23163.
CPD806406 se utiliza con el Manómetro de Indicación y Adaptador FT 23064-01 y reemplaza la Punta estándar con la Punta Especial FT 23064-05 Véase la Fig.1
Asegurarse que las marcas de tiempos se alinean en el cigüeñal (o utilizando CPD8404 ó CPD8512), y en la bomba de inyección.
Hacer el proceso de tensar la correa de tiempos (dentada) de acuerdo a las instrucciones del fabricante. Debe haber tensión correcta de correa.
Girar el cigüeñal en dirección normal hasta los 90 grados antes de PMS (primer cilindro). Insertar y fijar el Manómetro de Indicación en la Placa de Consigna. Deberá sujetarse el eje Manómetro de Indicación seguro en el Adaptador.
Inicialmente, retener el eje Manómetro de Indicación sujetando ligeramente la Tuerca.
1/. Fijar la Placa de Montaje en los agujeros de la caja del eje de levas, utilizando los Tornillos M6 x 10 mm., en la válvula de entrada del cilindro 1 (sobre el resalte de la leva 2 desde el frontal).
2/. Empujar la Placa a la derecha hasta que descanse sobre la posición del tope derecho. La pata del Manómetro de Indicación deberá descansar sobre el círculo base de la leva.
3/. Aflojar la Tuerca y precargar el indicador a no más de 0,50 mm. y asegurar el Manómetro de Indicación firmemente en el Adaptador.
4/. Poner el bisel de Manómetro de Indicación en cero (punto de referencia)
5/. Empujar el bloque a la izquierda hasta que descanse sobre la posición del tope izquierdo para que el indicador descanse sobre el resalte de leva.
NOTA: El Manómetro de Indicación ahora leerá menor que el punto de referencia.
6/. Girar el cigüeñal en la dirección normal de motor hasta el PMS (Centro Absoluto) asegurándose que se alinean todas las marcas de alineación. Se eleva el resalte de leva y el Manómetro de Indicación retorna al punto de referencia cero y continúa hasta el valor nominal correcto 0,55 +/- 0,03mm. Si no se obtiene el valor nominal habrá que ajustar los tiempos de leva.

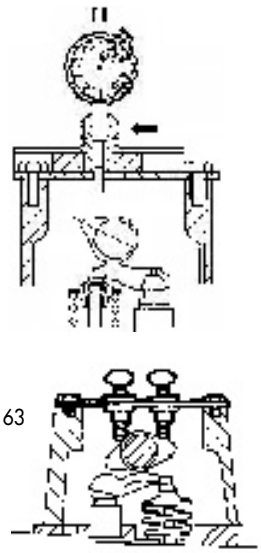
Fig.1



Ajuste de Tiempo

Asegurarse que la tensión de la correa de tiempos (dentada) está correcta. Hay que alinear todas las marcas de tiempos (poner a punto) y el motor deberá estar en PMS (Centro Absoluto).
Con una llave de extremo abierto de 22 mm. en el hexágono del eje de levas para evitar que gire, aflojar el perno de sujeción del piñón de eje de levas. Es importante mantener las posiciones de cigüeñal y de eje de levas sin cambio.
Ahora deberá girarse el eje de levas con la llave en la dirección correcta normal hasta que el Manómetro de Indicación lea aproximadamente 0,80mm. Entonces, girar el eje de levas con la llave en dirección opuesta a la normal hasta que el Manómetro de Indicación lea 0,60-0,64mm. Es importante que no se mueva el eje de levas de esta posición. Montar la Herramienta de Seguridad de Eje de Levas FT 23163 en cualquiera de las tres posiciones restantes de cilindro, y ajustar los tornillos de mano hasta que contacten los resaltes de leva. Véase la Fig.2. Montar un nuevo perno para retener el piñón del eje de levas y apretar al par específico. Remover ambas herramientas de tiempos (poner a punto), pero no cambiar la consigan del Manómetro de Indicación.
Girar el cigüeñal dos revoluciones hasta las marcas correctas de tiempos (poner a punto). Volver a poner la herramienta de medición de eje de levas, asegurándose que el Manómetro de Indicación está en la posición de tope izquierdo, con el Manómetro de Indicación descansando sobe el resalte de leva. Chequear que se muestra la correcta lectura nominal de medición de 0,55 +/- 0,03mm.

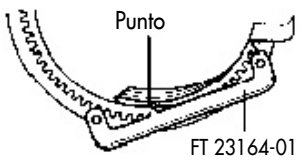
Fig.2



Herramienta de Consigna de TDC (Centro Absoluto) de Volante de Motor – Motor Vauxhall/Opel, 17DTL (-97)

Cuando se remueve/instala una correa de tiempos (dentada) y se establece o chequea la posición correcta de tiempos, la Herramienta de Consigna de Volante de Motor se utiliza para determinar la posición PMS (Centro Absoluto) del volante de motor/cigüeñal. Se acopla a la caja del volante de motor y ofrece la posición de 'punto' de alineación de la marca PMS (Centro Absoluto).

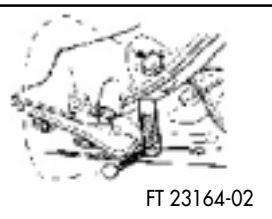
Fig.3



Pines de Seguridad de Volante de Motor / Cigüeñal.

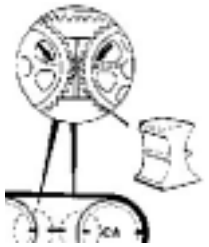
Están diseñados para localizar y asegurar el motor en el Centro Absoluto (TDC) mediante la alineación de un agujero punto de referencia en la caja del volante de motor / motor. Poner el Pin correcto en el agujero de acceso y girar el motor a mano hasta que el pin de seguridad entre en el agujero de tiempos del volante de motor, el motor está ahora posicionado en la posición correcta de tiempo (poner a punto).

Fig.4



Twin-Cam Locking Tools. These tools enable the camshafts to be locked in relationship to each other because the pressure of the compressed valve springs can cause the position to change after the timing belt has been removed.
Changing the timing belt is made easier by locking the camshafts in position and reduces the risk of damage. Damage will occur to the valves if they make contact with the piston after the correct timing position of the camshafts is lost.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

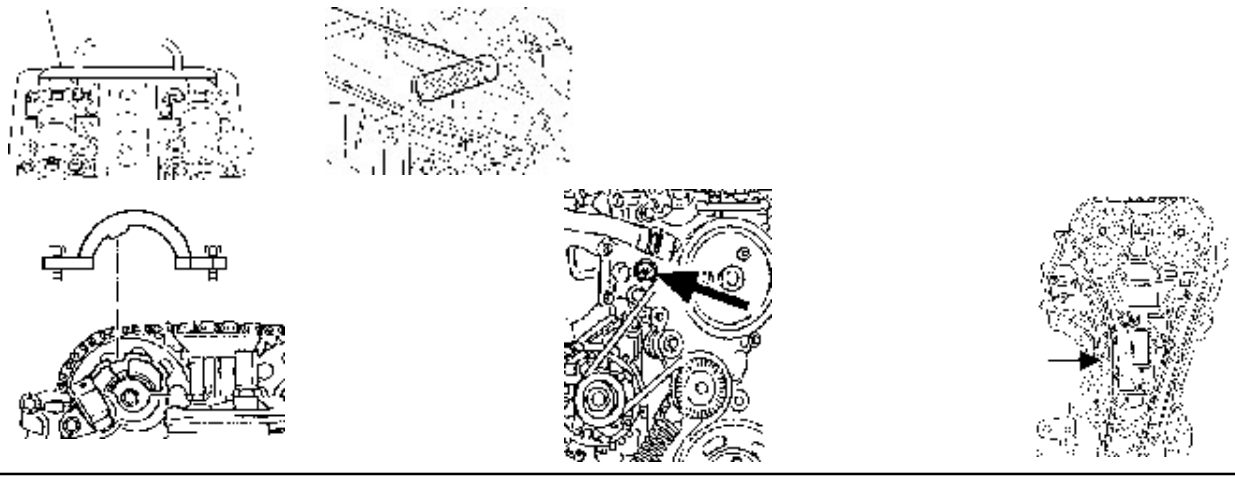
The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

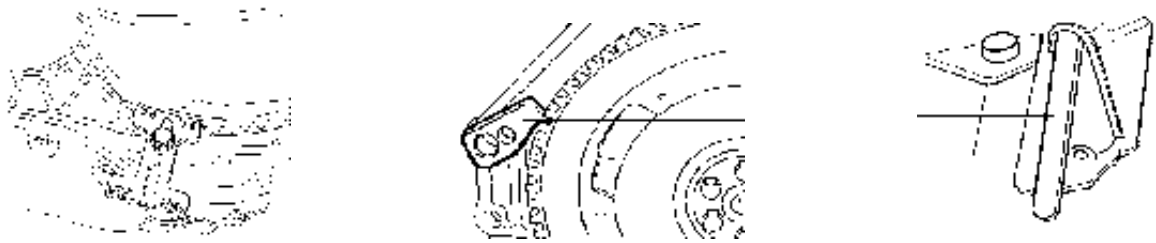
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



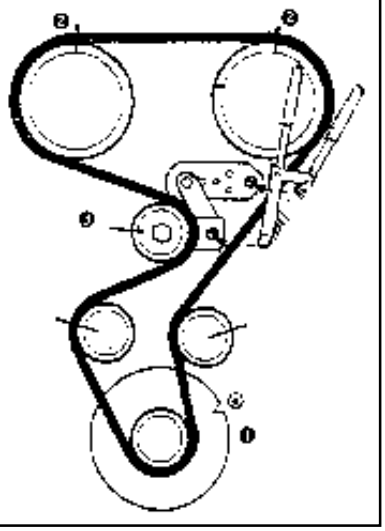
Flywheel Locking Tools.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

Fig.9



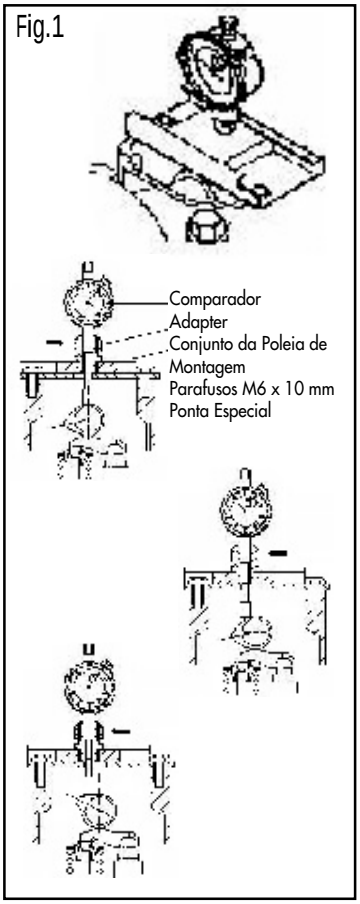
PO

Instruções para uso: Veja sempre o manual de serviço dos fabricantes do veículo ou um livro adequado de instruções específicas.
Aviso: A regulação incorrecta ou fora de fase de um motor pode resultar em danos nas válvulas. Recomendamos que gire sempre o motor lentamente, à mão, e verifique de novo as posições de regulação do eixo de transmissão e do eixo de manivela.

Verificação da Regulação Para ser usada no Vauxhall/Opel (87-), 16DA/17D/17DR/17DTL

Ferramenta de Assentamento do Eixo de Transmissão
NOTA FT 23064 A Ferramenta de Assentamento do Eixo de Transmissão é usada com a Ferramenta de Travagem do Eixo de Transmissão associada FT 23163.
CPD806406 É usada com o Indicador de Testes de Medidores usando o Conjunto de Adaptador CPD806401 e substituindo de Ponta Standard o Indicador de Testes de Medidores padrão com uma Ponta Especial CPD806411. Veja a Figura. 1.
Assegure-se de que todas as marcas de regulação estão alinhadas com o eixo de manivela (ou use CPD8404 ou CPD8512) e com a bomba de injecção.
Efectue o processo de tensão do cinto de regulação conforme as instruções do fabricante. A tensão do Cinto deve estar correcta.
Gire o eixo de manivela na direcção normal de rotação do motor para 90 graus antes do TDC (1º cilindro). Introduza e fixe o Indicador de Teste de Medidores na Placa de Assentamento. O eixo do DTI deve estar fixo com segurança ao Adaptador.
Inicialmente, retenha o eixo do DTI, apertando ligeiramente com a Porca.
1/. Fixe a Placa de Montagem nos orifícios do invólucro do eixo de transmissão usando os dois parafusos de bloqueio M6 na válvula de entrada do 1º cilindro (sobre o 2º lóbulo do came a partir da frente).
2/. Empurre a Placa para a direita até este parar contra a posição de paragem direita. O pé do DTI deve parar sobre o círculo de base do came.
3/. Solte a Porca e carregue o indicador previamente para não mais de 0,5 mm e segure o DTI firmemente ao Adaptador.
4/. Coloque o engaste em zero (ponto de nível).
5/. Empurre o Bloco para a esquerda até este parar contra a posição de paragem da esquerda até o indicador parar sobre o lóbulo do came.
NOTA: O indicador de teste de medidores lerá então abaixo do ponto de nível.
6/. Gire o eixo de manivela na direcção normal de rotação do motor para o TDC, assegurando-se de que todas as marcas de regulação estão alinhadas. O lóbulo do came subirá e o DTI voltará ao ponto de nível zero e continuará até ao valor nominal correcto de 0,55 ± 0,03 mm. Se o valor nominal não for obtido, a regulação do came deve ser ajustada.

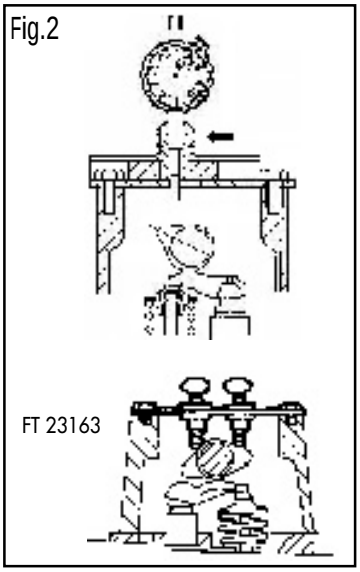
Fig.1



Ajustamento da Regulação

Assegure-se de que a tensão do cinto de regulação está correcto. Todas as marcas de regulação devem ser alinhadas e o motor deve estar no TDC.
Usando uma chave de porcas de extremidades abertas de 22 mm no hexágono do eixo de transmissão para evitar que ele gire, desaperte a cavilha de aperto da roda dentada do eixo de transmissão. É importante que as posições dos eixos de manivela e dos eixos de transmissão permanecem inalteradas.
O Eixo de Transmissão deve então ser girado usando a chave de porcas na direcção normal da rotação até o indicador de teste de medidores marcar cerca de 0,8 mm. Usando a chave de porcas, gire então o eixo de transmissão de volta, na direcção oposta à rotação normal, até o Indicador de Teste de Medidores marcar 0,6 a 0,64 mm. É importante que o eixo de transmissão não se mova da sua posição. Coloque a Ferramenta de Travagem do Eixo de Transmissão CPD8511 a qualquer uma das três posições restantes do cilindro e ajuste os parafusos borboleta até estes entrarem em contacto com os lóbulos do came. Veja a Figura. 10. Coloque uma cavilha nova para reter a roda dentada do eixo de transmissão e aperte-a até ao torque especificado. Retire ambas as ferramentas de regulação mas não altera o parâmetro do Indicador de Teste de Medidores.
Gire o eixo de manivela duas revoluções completas para as marcas correctas de regulação. Instale a ferramenta de medição do eixo de transmissão de novo, verificando se o Indicador de Teste de Medidores está na posição da esquerda, com o DTI junto ao lóbulo do came. Verifique se a marca de medida nominal correcta é de 0,55 mm ± 0,03 mm.

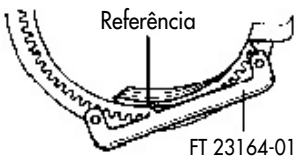
Fig.2



Ferramenta de Assentamento do TDC do Volante – motor 17DTL da Vauxhall/Opel (-97)

Quando o cinto de regulação estiver a ser removido ou instalado e a posição de regulação correcta estiver a ser verificada, a Ferramenta de Assentamento do Volante é usada para determinar a posição CIS do volante e do eixo de manivela. Esta é adaptada ao invólucro do volante e fornece uma posição de "referência" para alinhar a marca de CIS.

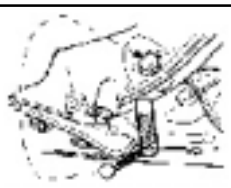
Fig.3



Pinos de Travagem do Volante e do Eixo de Manivela

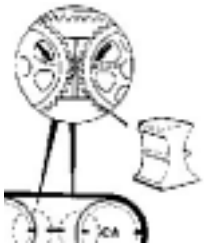
Estes são desenhador para localizar e travar o motor no Centro Inerte Superior (CIS) por meio do alinhamento de um orifício de nível no volante /invólucro do motor e volante. Coloque o Pino correcto no orifício de acesso e gire o motor manualmente até o pino de travagem se prender no orifício de regulação do volante. O motor estará então travado na posição correcta de regulação.

Fig.4



Ferramentas de Travagem de Cames Gémeos Estas ferramentas permitem que os eixos transmissores possam ser travados em relação uns aos outros, porque a pressão das molas comprimidas das válvulas pode fazer com que a posição seja alterada quando o cinto de regulação for removido.
A mudança do cinto de regulação é facilitada pela travagem dos eixos transmissores em posição, reduzindo o risco de danos.
As válvulas serão danificadas se entrarem em contacto com o pistão, depois da posição correcta de regulação dos eixos transmissores ser perdida.

Fig.5



Engine Timing – Astra, Astravan, Zafira, Vectra, Omega, Sintra, Frontera with X20DTL / X20DTH / X22DTH 2,0 & 2,2 Eco Tec Diesel Engines

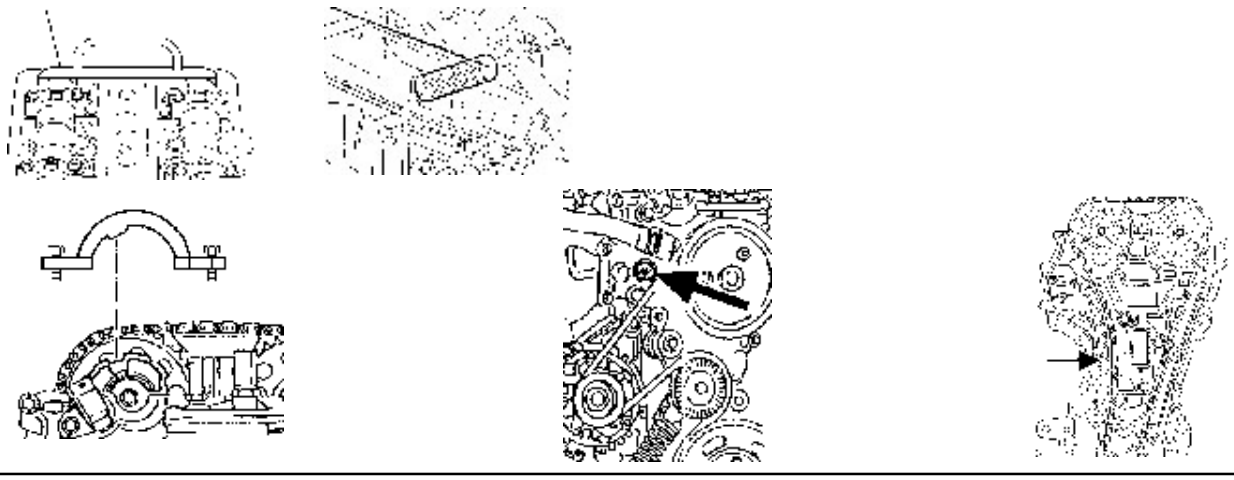
The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. The camshaft is positioned horizontally with the location hole at the top. Use the camshaft setting tool (T) to align the camshaft (see Fig.)
2/. The Injection Pump Setting Pin (R) aligns to a timing mark on the sprocket and is fitted through a recess in the injection pump flange and into the retaining hole. (see Fig.)
3/. The crankshaft locking pin is used to set the crankshaft at TDC position. This tool is fitted through the crankshaft pulse pick-up opening in the engine block and locates into a slot in the crankshaft. (see Fig.)
4/. Fuel Pump Sprocket Timing Tool (P+Q) enables the correct timing position through action to the simplex chain and camshaft sprocket. First attach the special wrench vertically to the sprocket, then attach the bracket assembly to the cylinder head. Using a _" Sq.Dr. wrench to apply light pressure to turn the camshaft in an anti-clockwise (contra-engine rotation). The screw is the turned to contact the special wrench and retain this position.
5/. At this stage the Pump Locking Pin (R) should be free to be removed and re-fitted. If this pin is tight, adjust the screw until the pin is easy to move. The camshaft sprocket bolt can now be tightened and refit the simplex chain tensioner.

Fig.6

Engine Timing – Corsa, Agila with X10XE 1,0 12v Eco Tec / X12XE 1,2 16v Eco Tec engines

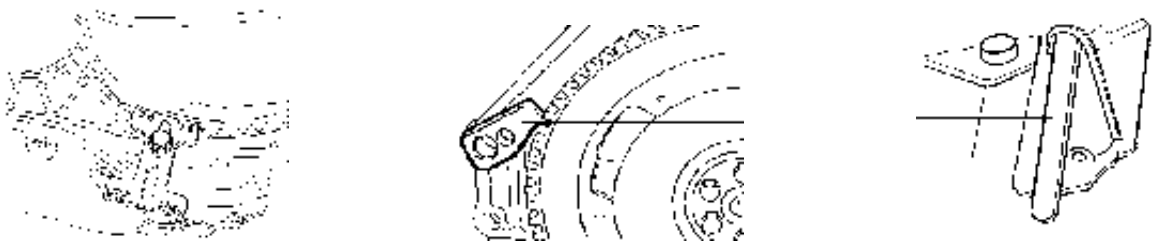
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.
(GB) The correct engine timing position is achieved when the first cylinder is at TDC and each of the timing tools can be correctly fitted.
1/. Camshaft Setting Plate is used to correctly position both camshafts, and fits into the slots of each camshaft to align horizontally in relation to the top surface of the cylinder head.
2/. The crankshaft locking pin which positions the crankshaft at TDC is inserted through the engine block and locates into a slot located on the first crank web of the crankshaft.
3/. The Timing Disc Position Gauge is connected to the inlet camshaft sprocket to achieve the correct timing position of the camshaft and the sensor disc.
4/. Tensioner retaining pins are used to retain the hydraulic activated tensioner rail which must be moved from contact with the simplex chain during the work of belt replacement.

Fig.7



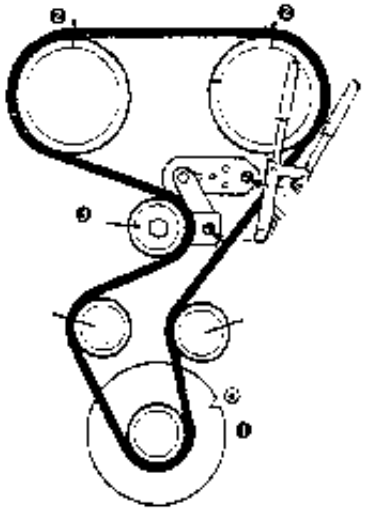
Flywheel Locking Tools.
These tools are designed especially to enable the flywheel to be held static whilst releasing and re-tightening the pulley fastener, during timing belt replacement and engine timing activity. It is recommended that Crankshaft Timing Pins are not used for this purpose.

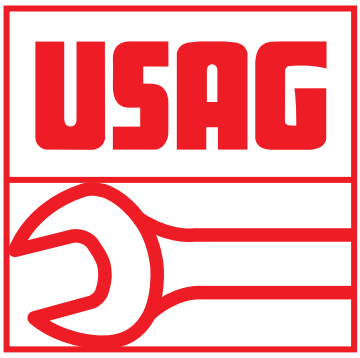
Fig.8



Timing Belt Tensioner.
1/. Disconnect the ground cable from the battery, air intake hose and air cleaner housing, throttle valve manifold cover, fastening bolts from front toothed belt cover, V-belt from alternator. If present, remove engine compartment cover.
2/. Align notch on V-belt pulley by turning the pulley in the direction of engine rotation. Fig.9.❶
3/. Check that the notches on the camshaft pulleys align with the marks on the cylinder head cover. Fig.9.❷
Important. Turn the crankshaft slowly and smoothly.
4/. Remove, disconnect the V-belt from the power steering hydraulic pump, and V-belt pulley – counterhold on fastening bolt of toothed belt drive gear.
Important. Check position of marks on V-belt pulley and camshaft pulleys before removing the V-belt pulley.
5/. Loosen toothed belt tension roller and remove toothed belt.
6/. Starting at the crankshaft sprocket, fit the new timing belt ensuring that it is taut between sprockets on the non-tensioned side.
Important. Check timing marks and make the following adjustments when the engine is at room temperature or cold.
7/. Attach Timing Belt Tensioner No. FT 23046 as shown by outline and loosen the fastening bolt of toothed belt tension roller.Fig.9.❸
8/. Mark the 8th. tooth anti-clockwise from the TDC (top dead centre) mark on the camshaft sprocket.
9/. Rotate the crankshaft twice in clockwise direction until the mark on the 8th. tooth aligns with the timing mark on the timing belt rear cover.
Important. Turn the crankshaft slowly and smoothly.
10/. Remove the Timing Belt Tensioner No. 23046
11/. Turn camshaft pulleys further to TDC mark.Fig.9.❷ The mark on V-belt pulley must then align with the pointer. Fig.9.❶
Re-connect V-belt pulley and torque tighten to 20 Nm (15 lbf.ft) Using a new bolt, torque tighten toothed belt tension roller to cylinder block to 25Nm (18 lbf.ft) +45º +15º, use Angular Torque Gauge No. (??????)
12/. If present re-connect V-belt to power steering pump, engine compartment cover, front toothed belt cover, V-belt to alternator. Check and adjust V-belt tension.
13/. Re-connect aircleaner housing, air intake hose, cover to throttle valve manifold, and ground cable to battery.

Fig.9





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