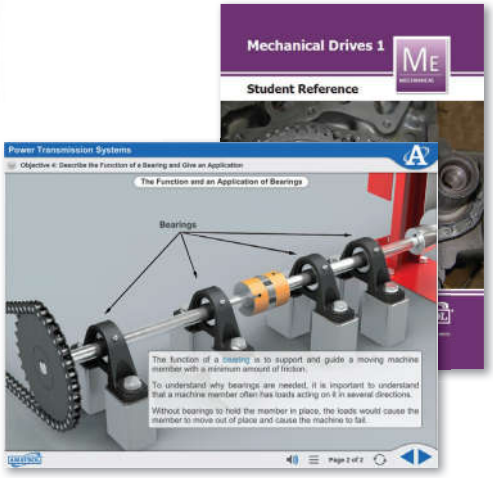
Mechanical Drives 1 Learning System

970-ME1

ME
MECHANICAL

970-ME1 Learning System
(Includes 3 Component Storage Trays)



Interactive Multimedia and Student Reference Guide

Learning Topics:

- Mechanical Drive Systems
- Shaft Speed Measurements
- Key Fasteners
- Torque & Power Measurements
- Power Transmission Systems
- Shaft Alignment
- V-Belt Drives
- Belt Tensioning
- Chain Drives
- Chain Tension Measurement
- Spur Gear Drives
- Gear Drive Designs
- Multiple Shaft Drives
- Sleeve Couplings

Amatrol's Mechanical Drives 1 Learning System (970-ME1) covers the installation, operation, alignment, and applications of various motor drive systems. Learners will use the 970-ME1 system and curriculum to gain theoretical knowledge and hands-on skills for shaft, belt, gear, and chain drives using real-world motor drive components. The 970-ME1 covers major topic areas like mechanical drive systems, key fasteners, power transmission systems, v-belt drives, chain drives, spur gear drives, and multiple shaft drives.

The Mechanical Drives 1 Learning System includes a constant speed drive motor, variable speed motor, motor control unit, and multi-tray storage unit that include real-world components for building and operating mechanical drive applications. Learners will practice hands-on skills like leveling an electric motor, calculating mechanical efficiency, installing a flexible jaw coupling, installing and removing a chain with a master link using a chain puller, and installing and aligning a sleeve coupling and shaft. Amatrol expertly mixes theoretical concepts immediately followed by hands-on practice to build the strongest possible retention and competency for learners. This method allows learners to simultaneously build motor drive conceptual knowledge and hands-on competency.

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Technical Data

Complete technical specifications available upon request.

Mobile Workstation
International Motor Control Unit
Constant Speed Drive Motor
Variable Speed Motor
Lockout/Tagout Package
Prony Brake
Digital Tachometer
Alignment / Measurement Package
Indicator Package Level 1
Multi-Drawer Storage Unit
Interactive Multimedia Curriculum (M19416)
Student Reference Guide (H19416)
Instructor's Guide (C19416)
Installation Guide (D19416)
Requires:
Hand Tool Package (1227)
Utilities:
Electricity (120 VAC/60 Hz/1 phase)

Practice Hands-On Skills Like Installing a V-Belt Drive

The Mechanical Drives 1 Learning System features a mobile workstation with a constant speed drive motor, variable speed motor, motor control unit, and multi-drawer storage unit. This system includes various components separated into sliding trays for building specific motor drive systems. These sliding trays include components for building and running shaft, belt, gear, and chain drives. Additional components include a prony brake, lockout/tagout package for safety skills, and a digital tachometer and alignment / measurement package for motor drive measurement and alignment skills.

Motor Control Console

Learners will use this system to practice real-world motor drive skills like: install and adjust a pillow block anti-friction bearing and shaft, align two shafts using a straightedge and feeler gauge, install and align a fractional horsepower v-belt drive with finished bore, determine allowable chain sag for specific applications, and measure gear backlash.

Mechanical Drives Training Designed for Safety and Efficiency


Components Store Easily in Sliding Drawers

The Mechanical Drives 1 Learning System is designed with safety and efficiency in mind. Components store on sliding trays under the training surface for easy access and storage. Each component fits within molded slots on these trays for easy identification and inventory. The work surface is shielded by a protective guard that locks into place. If the guard is dislodged or removed, the motor drive circuits immediately stop.

Interactive Multimedia Motor Drive Curriculum

The Mechanical Drives 1 Learning System includes highly interactive multimedia curriculum that integrates various types of learning methods to create an astoundingly engaging learning experience. Amatrol's multimedia includes text with voiceovers, video, 3D animations, pictures, and interactive activities, quizzes, and self-reviews.

Specific to the Mechanical Drives 1 course, topics include motor mounting, keyseat fasteners, shaft alignment, belt tensioning, chain tension measurement, and spur gear installation. Within these topics, learners will study objectives like how to mount and level an electric motor, the types and applications of keys, the types of shaft misalignment, how to determine belt tension, adjusting chain sag to a specified amount using adjustable centers, and the function of backlash.

Student Reference Guide

A sample copy of the Mechanical Drives 1 Student Reference Guide is included with the learning system. Sourced from the system's interactive multimedia curriculum, the Student Reference Guide takes the entire series' technical content from the learning objectives and combines them into one perfectly-bound book that students can reference for years to come. If you would like to inquire about purchasing additional Student Reference Guides for your program, contact your local Amatrol Representative for more information.

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MECHANICAL DRIVES 1 LEARNING SYSTEM

Shall include the following components: mobile workstation with motor control unit, base motor package, bearing / prony brake package, shaft/standoff package, rotary power component package, fastener package, alignment package level 1, gauging package level 1, auxiliary hardware package, student curriculum, and instructor's guide. These components shall meet the following minimum specifications:

Mobile Workstation

The mobile workstation shall be constructed of welded tubular steel with minimum dimensions of 30-in. W x 40-in. H x 48-in. L. This unit shall be supplied with (4) casters, at least two of which are locking. It shall have at least three (3) sliding drawers mounted on rollers located below the worksurface for storage of component trays and parts. It shall have (2) guards that are electrically interlocked to switch off motor operation if they are removed. The trays with components should be stored in the pullout drawers permitting easy access for student activities. The worksurface shall be constructed of (2) modular plates which are made of Aluminum Tooling Plate. These tooling plates shall measure 30-in. W x 20-in. L x 0.375-in. thick. Each plate shall be drilled with a grid pattern of slots and holes for mounting mechanical drive setups that are directly referenced in the curriculum. The workstation shall have a lower mounting shelf for location of the storage drawer unit.

Motor Control Unit

This unit shall provide control of a variable speed electric motor via a VFD. The VFD has provisions to monitor the performance of the drive system. The enclosure has minimum dimensions of 17.5-in. L x 10-in. T x 0.1-in. deep. The enclosure shall be built of stainless steel and silkscreened with labels of components. The components shall include a "main power" switch/circuit breaker with lockout/tagout device, power on indicator lamp, a "power on" pushbutton, a motor "start" pushbutton, a motor "stop" pushbutton, a "emergency stop" mushroom button, a "constant speed" or "variable speed" selector switch, and a "VFD" (variable frequency drive) for controlling the motor. The unit shall have a main power cord, which plugs into a wall outlet and supplies power to all items in the motor control unit. Two plug-in connectors shall be mounted to the side of the unit to enable connection of the motor and guard interlocks to the control unit.

The drawer unit shall be constructed from heavy-duty gauge steel, welded and painted. It shall have 4 sliding drawers mounted on rollers, measuring 20.5-in. L x 15-in. H x 9-in. W.

Base Motor Package

This package shall include the following items: electric motor, adjustable motor base, mounting bolt package. These components shall meet the following minimum specifications:

> **Adjustable Motor Base**
>
> This unit shall be designed to position the electric motor in such a way that permits tensioning of a v-belt or chain drive system. This unit shall be designed with heavy-duty steel construction that uses a pivoting base driven by a lead screw to position and lock the motor in place.
>
> **Electric Motor**
>
> Shall be a .38 hp, variable frequency drive (VFD) controlled, 5-8-in. diameter shaft, 230VAC/60 Hz, 3 phase. It shall have a power cable with plug-in cable to motor control unit.

Bearing / Prony Brake Package

The tray shall be constructed of vacuum formed plastic with a cavity and label of each component. The minimum dimensions shall be 20-in. W x 17.5-in. mm L x 2-in. T. The tray will be stored below the worksurface in one of the (3) sliding drawers. The plastic tray shall have cavities to house the following components for easy visual identification and storage.

It shall include the following items:

> (2)-Pillow block bearing, 1-in. bore, set screw

(6)-Pillow block bearing, 5/8-in. bore, set screw
(1)-Prony brake tensioner, adjustable from 0-14 kg (0-30 lbs.)
(1)-Chain puller
(1)-Prony brake drum assembly

The following additional items shall be supplied and shall be stored in the drawer unit:

(1)-Prony brake belt
(1)-Retainer pin for prony brake

Shaft / Standoff Package
The tray shall be constructed of vacuum formed plastic with a cavity and label of each component. The minimum dimensions shall be 20-in. W x 17.5-in. mm L x 2-in. T. The tray will be stored below the worksurface in one of the (3) sliding drawers. The plastic tray shall have cavities to house the following components for easy visual identification and storage.

It shall include the following items:

(1)-Shaft, 5/8-in. dia., 12-in. L
(1)-Shaft, 5/8-in. dia., 8-in. L
(1)-Shaft, 5/8-in. dia., 12-in. L (3 keyways)
(1)-Shaft, 1-in. dia., 12-in. L
(12)-Pillow block bearing standoff, 1 ¾-in. dia. X 2.57-in. L
(4)- Pillow block bearing standoff, 1 ¾-in. dia. X 2.29-in. L
(1)-Hub jaw coupling, 5/8-in. bore with jaw coupling spider
(1)-Sleeve coupling, 5/8-in. bore
(4)-Motor standoff, 1.5-in. dia., 1.25-in. L
(1)-Motor standoff, 1.5-in. dia., 1.237-in. L

Rotary Power Component Package
The tray shall be constructed of vacuum formed plastic with a cavity and label of each component. The minimum dimensions shall be 20-in. W x 17.5-in. L x 2-in. T. The tray will be stored below the worksurface in one of the (3) sliding drawers. The plastic tray shall have cavities to house the following components for easy visual identification and storage.

It shall include the following items:

(1)-Sheave, FHP, 5/8-in. bore, 2-in. PD
(1)- Sheave, FHP, 5/8-in. bore, 3-in. PD
(1)- Sheave, FHP, 5/8-in. bore, 4-in. PD
(1)-Sprocket, 5/8-in. bore, 12 teeth
(1)-Sprocket, 5/8-in. bore, 16 teeth
(1)-Sprocket, 5/8-in. bore, 24 teeth
(1)-Spur gear, 5/8-in. bore, 24 teeth
(2)-Spur gear, 5/8-in. bore, 36 teeth
(1)-Spur gear, 5/8-in. bore, 48 teeth
(1)-Spur gear, 5/8-in. bore, 24 teeth
(1)-Spur gear, 5/8-in. bore, 60 teeth

Fastener Package
Shall include grade 5 or above bolts, plain washers, lock washers, and nuts of various sizes. Fasteners shall be stored in (2) partitioned cases for easy identification and organization. The cases shall be stored in the drawer unit.

Alignment Package Level 1
A package of tools and devices shall be supplied that enables the student to perform alignment and measurement of mechanical drives. These items shall be stored in the drawer unit.

It shall include the following items:

(1)-Thickness Gauge, 26 leaves
(1)-3 3/8-in. Level
(1)-36-in. Straight Edge
(1)-9-in. Magnetic Torpedo Level
(1)-Combination Square, 4-in.

Gauging Package Level 1
This package shall be used to perform precision motor leveling and with added components precision shaft alignment. These items shall be stored in the drawer unit.

It shall include the following items:

(1)-Dial indicator
(1)-Magnetic base with clamps and attachment rods for the dial indicator
(1)-Magnetic base mounting with fastening knobs and hardware
(1)-Needle indicator contact point
(1)-Belt tension checker
(1)-Sheave gauge set
(1)-Involute gear tooth gauge
(20)-Stainless steel shim, 2-in. X 2-in. X 0.003-in.
(20)-Stainless steel shim, 2-in. X 2-in. X 0.005-in.
(20)-Stainless steel shim, 2-in. X 2-in. X 0.010-in.
(20)-Stainless steel shim, 2-in. X 2-in. X 0.020-in.
(8)-Stainless steel shim, 2-in. X 2-in. X 0.050-in.

Auxiliary hardware package
This package shall be used to supplement the other packages above to enable to the student to perform the skills in the curriculum.

It shall include the following items:

(1)-Industrial grade digital tachometer, handheld laser type with LCD display
(1)-Water bottle for adding water to prony brake drum for cooling
(1)-V-belt, SPA section
(1)-Roller chain, 0.5-in. pitch
(1)-Master link
(1)-Canvas zipper pouch for chain storage
(24)-Keystock, 3/16-in.
(1)-Reflective tape, 23-in. L x 0.6-in. W
(1)-Teflon lubricant, aerosol can for easy application
(1)-4 drawer storage unit, heavy gauge steel construction
(1)-Lockout / tagout kit consisting of (2) locks and (5) tags

Student Curriculum -The student curriculum shall consist of one (1) interactive multimedia course of seven (7) modules with forty-four (44) industry tasks. Topics shall include: Introduction to Mechanical Drive Systems, Key Fasteners, Power Transmission Systems, Introduction to V-Belt Drives, Introduction to Chain Drives, Spur Gear Drives, and Multiple Shaft Drives.

The student curriculum shall be designed in a skill-based format that focuses on teaching industry-relevant tasks. The objectives shall be accomplished by organizing the learning material into a series of modules, which are further subdivided into three or more segments per module. All learning material needed shall be contained in the modules including text material, laboratory equipment activities, and multimedia directions. No external text sources shall be required. The specific cognitive skills taught by each text passage shall be identified next to the passage. Each lab activity shall be identified by the industrial task taught. All activities shall be highly detailed with step-by-step instructions to facilitate a self-directed learning environment. A combination of step-by-step enabling activities and creative, problem-solving activities shall be provided. A self-review of five to ten questions shall be provided after each segment. The curriculum must be capable of both self-directed and instructor directed study. All activities must correlate directly to the hardware supplied, with detailed illustrations and diagrams.

Teacher's Assessment/ Portfolio Guides

A teacher's guide shall be provided. It shall contain student data sheets, data sheet solutions, self-review answers, quizzes, quiz answers, student skill record sheets, and authentic assessment. A quiz shall be provided for each packet. A question shall be provided in each quiz for each cognitive objective taught. All tasks listed in the packet shall be listed on personalized student record sheets. The Teacher's Assessment/ Portfolio Guide shall include directions for authentic skill assessment.

Amatrol Model No. 970-ME1 or equal

970-ME1
MECHANICAL DRIVES 1 LEARNING SYSTEM

MODULE 1 INTRODUCTION TO MECHANICAL DRIVE SYSTEMS

SEGMENT 1	**MECHANICAL POWER TRANSMISSION SAFETY**
OBJECTIVE 1	Describe the function of a mechanical power transmission system and give an advantage
OBJECTIVE 2	Describe five methods of rotary mechanical power transmission and give an application of each
OBJECTIVE 3	Describe six rules of safe dress for working with power transmission equipment
OBJECTIVE 4	Describe eight mechanical transmission safety rules
OBJECTIVE 5	Describe the operation of the lockout/tagout system
SKILL 1	Perform a lockout/tagout
SEGMENT 2	**MACHINE INSTALLATION**
OBJECTIVE 6	Describe the function of a foundation and give three types
OBJECTIVE 7	Describe the function and construction of a bedplate
OBJECTIVE 8	Describe the function of a spirit level and give an application
OBJECTIVE 9	Describe the operation of a spirit level
SKILL 2	Use a spirit level to determine orientation of a surface
SEGMENT 3	**MOTOR MOUNTING**
OBJECTIVE 10	Describe three types of motor mounts and give an application of each
OBJECTIVE 11	Describe how fasteners are used to attach a motor mount to a bedplate
OBJECTIVE 12	Describe how to select fastener size and type for a motor mount
SKILL 3	Select a fastener size and type for a motor mount
OBJECTIVE 13	Describe how to mount and level an electric motor
SKILL 4	Mount an electric motor and correct for a soft foot condition
SKILL 5	Level an electric motor
SEGMENT 4	**SHAFT SPEED MEASUREMENT**
OBJECTIVE 14	Describe three methods of measuring motor shaft speed and give an application
SKILL 6	Use a digital tachometer to measure motor speed

MODULE 2 KEY FASTENERS

SEGMENT 1	**KEYSEAT FASTENERS**
OBJECTIVE 1	Describe the function and operation of a key fastener
OBJECTIVE 2	Describe the construction of five types of keys and give an application of each
OBJECTIVE 3	Describe how keys and keyseats are specified
SKILL 1	Select a key size for a given application
SEGMENT 2	**KEY ASSEMBLY**
OBJECTIVE 4	Describe how to measure the actual size of a key and keyseat
OBJECTIVE 5	Describe six types of set screws
SKILL 2	Measure the actual size of a key and keyseat given a sample
SKILL 3	Cut and file key stock to fit a keyseat

OBJECTIVE 6	Describe how to assemble a hub to a shaft using a key
SKILL 4	Assemble a hub to a shaft using a key fastener
SEGMENT 3	**TORQUE AND POWER MEASUREMENT**
OBJECTIVE 7	Describe two methods of loading a mechanical drive system
SKILL 5	Use a prony brake to measure shaft torque
OBJECTIVE 8	Describe how to calculate rotary mechanical power
SKILL 6	Calculate rotary mechanical power
SEGMENT 4	**MECHANICAL EFFICIENCY**
OBJECTIVE 9	Describe how to calculate mechanical efficiency and explain its importance
SKILL 7	Calculate mechanical efficiency
OBJECTIVE 10	Describe two methods of measuring shaft torque and give an application of each
OBJECTIVE 11	Describe three methods of measuring electric motor current
SKILL 8	Measure electric motor current

MODULE 3 POWER TRANSMISSION SYSTEMS

SEGMENT 1	**INTRODUCTION TO SHAFTS**
OBJECTIVE 1	Describe the function of a shaft and give an application
OBJECTIVE 2	List four types of shaft materials and give an application of each
OBJECTIVE 3	Describe how shafts are specified
SKILL 1	Identify shaft size given a sample
SEGMENT 2	**INTRODUCTION TO BEARINGS**
OBJECTIVE 4	Describe the function of a bearing and give an application
OBJECTIVE 5	Define three types of bearing loads and give an example of each
OBJECTIVE 6	Describe how bearings are positioned to support a load
OBJECTIVE 7	Describe the operation of a two categories of bearings and give an application of each
OBJECTIVE 8	Describe two methods of mounting a shaft bearing and give an application of each
SKILL 2	Install and adjust a pillow block antifriction bearing and shaft
SEGMENT 3	**INTRODUCTION TO COUPLINGS**
OBJECTIVE 9	Describe the function of a coupling and give an application
OBJECTIVE 10	Describe the function and application of four categories of mechanical couplings
OBJECTIVE 11	Describe the operation of a flexible jaw coupling
SKILL 3	Install a flexible jaw coupling
SEGMENT 4	**SHAFT ALIGNMENT**
OBJECTIVE 12	Describe the purpose of shaft alignment and give two types of misalignment
OBJECTIVE 13	Describe a general procedure for shaft alignment and give four measurement methods
OBJECTIVE 14	Describe the operation of the straight edge and feeler gage alignment method
SKILL 4	Align two shafts using a straight edge and feeler gage

MODULE 4 INTRODUCTION TO V-BELT DRIVES

SEGMENT 1	**BELT DRIVE CONCEPTS**
OBJECTIVE 1	Describe the function of the three basic components of a belt drive
OBJECTIVE 2	Define pitch and explain its importance
OBJECTIVE 3	Define the pitch circle, pitch diameter, and pitch length of a belt drive and explain their importance
OBJECTIVE 4	Describe how to calculate the pulley ratio and explain its importance
SKILL 1	Calculate pulley ratio
OBJECTIVE 5	Describe how to calculate the shaft speed and torque of a belt drive system
SKILL 2	Calculate the shaft speed and torque of a belt drive system
SEGMENT 2	**V-BELT OPERATION**
OBJECTIVE 6	List five types of belt drives and give an application of each
OBJECTIVE 7	List three types of V-belts and give an application of each
OBJECTIVE 8	Describe the operation of a V-belt drive
OBJECTIVE 9	Describe how to install and align a V-belt drive
SKILL 3	Install and align a V-belt drive with a finished bore
SEGMENT 3	**BELT TENSIONING**
OBJECTIVE 10	Describe how to determine belt tension for an application
SKILL 4	Determine the belt deflection force for a given application
OBJECTIVE 11	Describe three methods of adjusting belt tension
SKILL 5	Adjust belt tension using an adjustable mounting base
SEGMENT 4	**BELT TENSION MEASUREMENT**
OBJECTIVE 12	Describe three methods of measuring belt tension and give an application of each
SKILL 6	Use a belt tension tester to measure belt tension

MODULE 5 INTRODUCTION TO CHAIN DRIVES

SEGMENT 1	**CHAIN DRIVE CONCEPTS**
OBJECTIVE 1	Describe the function of the three basic components of a chain drive
OBJECTIVE 2	Describe how to calculate sprocket ratio and explain its importance
SKILL 1	Calculate sprocket ratio
OBJECTIVE 3	Describe how to calculate shaft speed and torque of a chain drive system
SKILL 2	Calculate the shaft speed and torque of a chain drive system
SEGMENT 2	**CHAIN DRIVE OPERATION**
OBJECTIVE 4	List four types of chain drives and give an application of each
OBJECTIVE 5	List four types of roller chain drives and give an application of each
OBJECTIVE 6	Describe the operation of a single-strand roller chain drive
OBJECTIVE 7	Describe how to install, align, and remove a roller chain drive system with adjustable centers
SKILL 3	Install and align a roller chain drive system with adjustable centers
SEGMENT 3	**CHAIN TENSIONING**
OBJECTIVE 8	Describe how to determine allowable chain sag for a given application
SKILL 4	Determine allowable chain sag for a given application
OBJECTIVE 9	Describe two methods used to adjust chain sag

SEGMENT 4	**CHAIN TENSION MEASUREMENT**
OBJECTIVE 10	Describe how to measure chain sag
SKILL 5	Use a rule and a straight edge to measure chain sag
SKILL 6	Adjust chain sag to a specified amount using adjustable centers
SEGMENT 5	**FIXED CENTER CHAIN INSTALLATION**
OBJECTIVE 11	Describe the function and operation of a master link
OBJECTIVE 12	Describe two methods of installing a lightweight chain which uses a master link
SKILL 7	Install and remove a chain with a master link using sprocket teeth
OBJECTIVE 13	Describe the operation of a chain puller
SKILL 8	Install and remove a chain with a master link using a chain puller

MODULE 6 SPUR GEAR DRIVES

SEGMENT 1	**GEAR DRIVE CONCEPTS**
OBJECTIVE 1	Describe the function of the three components of a gear drive system
OBJECTIVE 2	Define the gear pitch, pitch circle, and pitch diameter and explain their importance
OBJECTIVE 3	Describe how to calculate the gear ratio of a gear drive
SKILL 1	Calculate gear ratio
SEGMENT 2	**GEAR DRIVE DESIGNS**
OBJECTIVE 4	Describe how to calculate the shaft speed and torque of a gear drive system
SKILL 2	Calculate the shaft speed and torque of a gear train drive system
OBJECTIVE 5	Describe the functions of four types of gear drives and give an application of each
OBJECTIVE 6	List four types of parallel shaft gears and give an application of each
SEGMENT 3	**SPUR GEAR OPERATION**
OBJECTIVE 7	Describe eleven features of a gear
OBJECTIVE 8	Identify the twelve dimensions of a gear and explain the importance of each
OBJECTIVE 9	Identify the ten dimensions and features of a gear drive and explain the importance of each
OBJECTIVE 10	Describe the operation of a spur gear drive
SEGMENT 4	**SPUR GEAR INSTALLATION**
OBJECTIVE 11	Describe how to install and align a spur gear drive system
SKILL 3	Install and align a spur gear drive system
OBJECTIVE 12	Describe the function of backlash
SEGMENT 5	**SPUR GEAR ANALYSIS**
OBJECTIVE 13	Describe two methods of measuring spur gear backlash
SKILL 4	Measure gear backlash
SKILL 5	Adjust gear backlash to a specified amount

MODULE 7 MULTIPLE SHAFT DRIVES

SEGMENT 1	**MULTIPLE SHAFT GEAR ANALYSIS**
OBJECTIVE 1	Describe how to calculate the speed and torque output in a multiple shaft gear drive
SKILL 1	Calculate the shaft speed and torque of a multiple shaft gear drive system
OBJECTIVE 2	Describe the function of a compound gear drive system and give an application
OBJECTIVE 3	Describe how to calculate the torque and speed output of a compound gear drive system
SKILL 2	Calculate the torque and speed output of a compound gear drive system
SEGMENT 2	**MULTIPLE SHAFT DRIVE INSTALLATION**
OBJECTIVE 4	Describe how to determine the direction of rotation of a gear drive
SKILL 3	Determine the direction of rotation of a gear given its position in a gear drive
OBJECTIVE 5	Describe how to install and align a multiple shaft drive system
SKILL 4	Install and align a multiple shaft drive system
SEGMENT 3	**SLEEVE COUPLINGS**
OBJECTIVE 6	Describe the function of a solid coupling and list two types
OBJECTIVE 7	Describe the operation of a sleeve coupling and give an application
OBJECTIVE 8	Describe the alignment procedure of a sleeve coupling
SKILL 5	Install and adjust a sleeve coupling and shaft