

## Specifications for Seasonal Adjustment

- The X-12-ARIMA procedure is used for seasonal adjustments to each item.
- Updating the seasonal adjustments takes place every year around April by using all available time series. Until the next update, the seasonally-adjusted figures are calculated using expected seasonal factors.
- The orders of the ARIMA model are determined by using the command: "automdl" in general. However, the model: (0 1 1) (0 1 1) is applied if at least one of automatically selected orders exceeds 2.
- Trading days, holidays, and leap-year effects are adjusted, and the user-defined variable is used for adjusting holidays. Outliers and temporary changes are automatically detected/adjusted in estimating regARIMA models using the command: "outlier" with default settings. These adjustments are all based on AIC.
- All series are seasonally adjusted using a logarithmic transformation with a multiplicative model. The forecast with the ARIMA model is extended up to 60 months, while backcasting is not conducted.
- Note that additional specifications are examined for some items if the source statistics, such as Indices of Tertiary Industry Activity etc., publish specifications for seasonal adjustments. Other than that, specifications adopted based on additional examinations are shown below.

	ARIMA model	Trading days and leap-year adjustment	Holidays adjustment	Outliers
Real automobiles	(1 1 0) (2 1 0)	Yes (td)	Yes	TC2009. Nov A02010. Aug TC2010. Oct TC2011. Mar TC2011. Apr LS2012. Sep LS2014. Apr A02014. Dec A02015. Apr LS2019. Oct TC2020. Apr A02020. May TC2021. Sep LS2022. Jan
Real household electrical appliances	(0 1 1) (0 1 1)	Yes (td1no1pyear)	No	A02010. Nov TC2010. Dec LS2011. Aug A02014. Mar TC2014. Apr A02019. Sep TC2019. Sep TC2020. Jun
Nominal travel services	(1 1 0) (0 1 1)	Yes (td)	Yes	TC2003. Apr A02003. Jun TC2009. May A02009. Sep TC2011. Mar TC2019. Apr TC2020. Feb TC2020. Mar TC2020. Apr A02020. May TC2020. May A02020. Jun TC2020. Aug TC2020. Oct A02020. Dec TC2021. Jan TC2021. Feb A02021. Mar TC2021. Mar A02021. May TC2021. May A02021. Jul TC2021. Jul A02021. Nov A02021. Dec TC2021. Dec A02022. Feb A02022. Mar TC2022. Jun A02022. Aug A02022. Sep A02022. Nov A02023. Jan A02023. Mar TC2023. May A02023. Aug